★ ★ ★ CONTENTS ★ ★ ★

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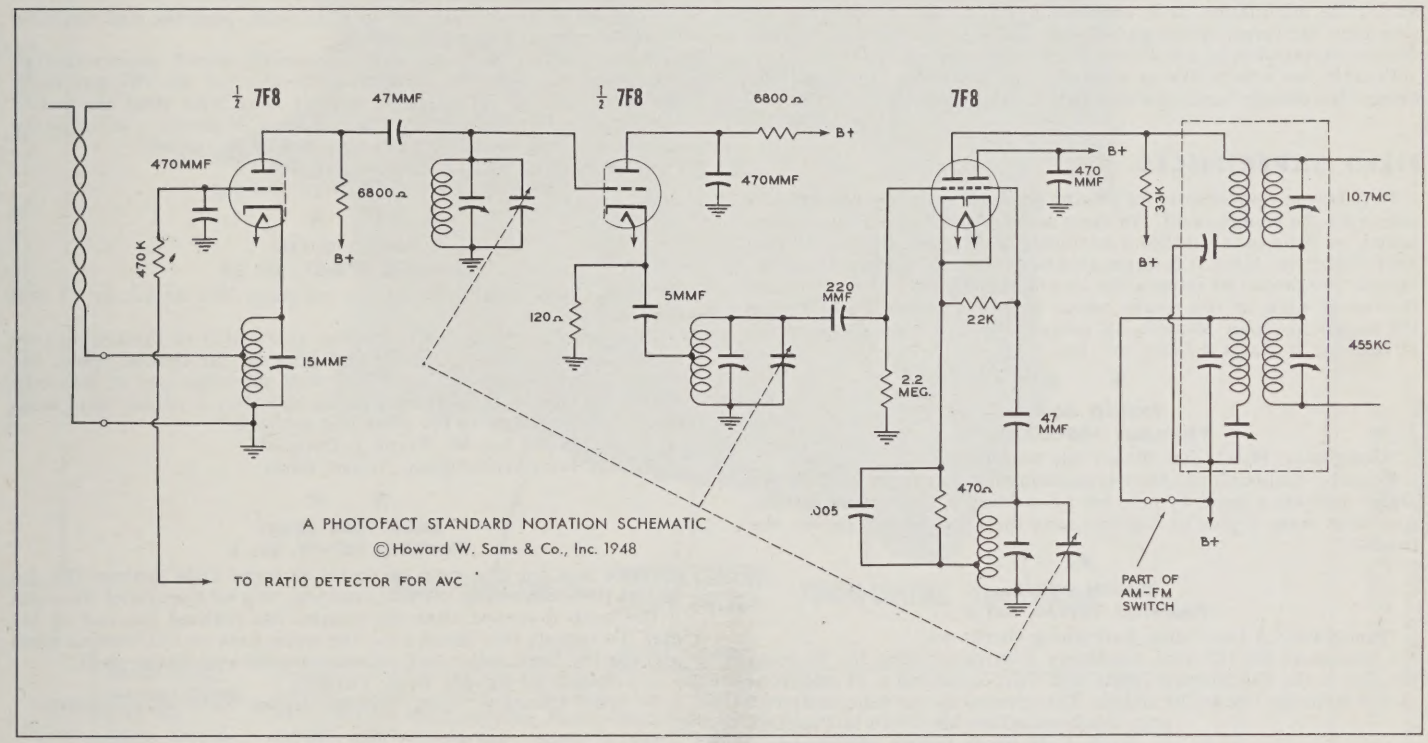
The PHOTOFACT Servicer

MARCH 10, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 4, No. 36

ROBERT M. ELLIS, *Editor*



WESTINGHOUSE H-164, H-166 and H-167

Photofact Set 36, Folder 28

The Westinghouse H-164, H-166, and H-167 covered by Folder No. 28 of this PHOTOFACT Set has an FM circuit that is quite off the beaten path. Accordingly, it is believed that our patrons will welcome an explanation of just what makes this set "tick." The schematic shown above covers in a simplified form the wiring of the input section of the receiver: switching and a number of AM components being omitted for the sake of clarity.

Let us start at the antenna and follow the course of an FM signal from the dipole antenna through to the first i.f. stage. The dipole input connects to an impedance-matching autotransformer connected in the *cathode* circuit of the first r.f. stage. This coil, in connection with its shunt 15 mmf. condenser, is broadly resonant, peaking near the middle of the 88-108 mc. band. Broadness of tuning is a natural accompaniment of a coil in the cathode circuit, since the coil is loaded by a resistance in the form of the plate resistance of the associated tube. Because of this broadness of tuning, it is unnecessary to use a variable condenser in the circuit; and at the same time the coil does make a definite contribution to the circuit in the way of increased gain and rejection of image frequencies, and it prevents cross modulation from high power signals of other services.

The first r.f. stage constitutes a grounded grid amplifier, a type of circuit which has such a high degree of stability that it permits the use of a twin triode amplifier for cascade r.f. stages, and this without the requirement of neutralization. The grid of the first r.f. stage is at ground potential because of the 470 mmf. by-pass condenser. The d.c. return of the grid is through the 470,000 ohm decoupling resistor to the ratio detector, which constitutes the only a.v.c. system of the set when operating on the FM band.

The second r.f. stage utilizes the second half of the 7F8 tube. The useful load of the stage is taken through the cathode. Because of this fact, and because the cathode potential follows in phase with changes of grid voltage, such a stage is referred to as a cathode follower. While the gain of tube with such a connection is less than unity, the circuit has several interesting advantages.

With a cathode follower circuit, the input capacity of a tube practically vanishes; whereas when a triode is used with normal connection the cold input capacity of the tube is multiplied by its amplification—the "Miller effect." The reason for this will become apparent if we consider the amplifying action of a normally connected tube.

In a conventional circuit, one of the most important capacities is the grid-plate, in which these two tube elements act like two plates of a condenser. If a negative charge is placed on the grid, the plate swings positive through the much wider range due to the normal amplifying action of the tube. This increase in potential acts just the same as if the capacity of the tube was increased many times. At high frequencies the gain of a normally connected tube may drop to near zero, because the resulting input capacities act as a by-pass condenser, virtually short-circuiting the input to the tube.

In a cathode follower circuit the effective input capacity is less than the cold capacity of the tube. This follows from the fact that a change of potential in the grid produces a corresponding change of potential in the cathode in the same phase. In other words, you cannot charge either a battery or a condenser by applying a potential of the same polarity and magnitude to its terminals. Accordingly, the grid-cathode capacity practically disappears as a factor of shunting the signal in a cathode follower type circuit.

A cathode-follower delivers at least as much power as the normal connection; and when coupled to an autotransformer (the tapped tuned circuit) will provide a nice voltage step up.

The second 7F8 tube in the receiver is used as a detector-oscillator, the local oscillator signal injection being accomplished by a common cathode connection to the tap on the oscillator coil. Tube hiss is a function of plate current and it is a matter of measurement that the use of a triode first detector results in a better signal to noise radio, if other factors remain equal.

The first i.f. transformer in the Westinghouse H-164, H-166 and H-167 is the only set we have seen to date using series tuning in the primary circuit instead of the conventional shunt tuning. This produces a high L to C ratio.

Another departure from convention is the use of a limiter with a ratio detector. Because a ratio detector is relatively insensitive to amplitude modulation, it is usually employed directly after the i.f. amplifier. However, Westinghouse has added a limiter stage to give double suppression of amplitude modulation and rejection of noise.

Frankly, we would like to meet the engineer who originated the design. His courage seems justified in departing from the conventional.

★ ★

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

PHILCO 46-420
Photofact 466-22, Set 6

"Complaint: Howl after the set has warmed up.

Remedy: Although the filter capacitors may check o.k., they do not always provide a good by-pass for r.f. Adding a .05 mfd. to .1 mfd. condenser from B-plus to B-minus near the r.f. tube will correct the trouble."

★

ZENITH 9H079
Photofact 467-34, Set 7

"Complaint: A loud hum. Everything checks o.k.

I disconnect the 100 mmf. condenser, PHOTOFACT Item No. 36, from the line to the FM antenna input, and then connected a .01 mfd. condenser from the line to the chassis. This cleared up the hum entirely."

Submitted by: Mr. Alvin H. Pudelko,
R. F. D. No. 1, Snover, Michigan

★ ★

WESTINGHOUSE H1251
Photofact 463-19, Set 3

"Complaint: Intermittent operation. The set always sounds 'alive.'

"The trouble was located in loose staking of the wing shield between the two sections of the gang condenser. Repair was made by soldering the shield to the condenser frame. A spot of solder was also used to anchor the movable plates of the trimmers which had broken loose from their spot-welded connection."

From the Howard W. Sams Clinic

★ ★

FARNSWORTH P56 RECORD CHANGER
(Similar to Model P51—See Photofact 473-36, Set 13)

"The needle will repeat in the starting groove of the record, caused by the binding of the tone arm.

"To remedy: Open the hex-headed screw (61) on the tone arm crank (59), also the Allen-head screw on the 'trip finger spacer' (54); and move the entire assembly down about 1/16 inch. Care must be taken during this procedure that the position of the trip finger is not changed, as this will upset the trip cycle."

★

ZENITH 5R086
Photofact 464-4, Set 4

"Complaint: Intermittent operation.

"Check the contacts on the loop antenna. If push-back insulation is used on the leads, these contacts may be shorted by the wire laying across them. This may occur if the loop is moved for any reason, or jarred when the set is moved from one location to another, thereby disturbing the insulation. We must admit we sweated this one out."

Submitted by: Mr. Bernard Blatt, High-Tor Radio-Television Center, 8 First Street, Haverstraw, New York

RADIOLA 61-1
Photofact 474-25, Set 14

"Set sounded fuzzy at 1200 k.c. and higher.

"Cause: The dial cable drive wheel on the shaft of the variable condenser was slightly bent and barely rubbed against the chassis. With just a little bending the trouble was corrected."

Submitted by: Mr. Delwin C. Schwinck,
Schwink Radio Service, West Point, Nebraska

★ ★

PHILCO 48-1253
Photofact Set 36, Folder No. 17

"The set plays satisfactorily on the 'radio' position, but has little or no volume on phonograph.

"Check the wiring on the screen grounding switch, as on several of these models it was discovered that the plate of the 7B7 was being grounded instead of the screen circuit. The wire from the switch should go to Pin No. 3, instead of Pin No. 2. If the set is left with the incorrect wiring the 50X6 rectifier tube will be ruined."

Submitted by: Mr. Lloyd F. Tysdal,
529 South Grape Street, Medford, Oregon

★ ★

TEMPLE G-516
Photofact 478-31, Set 18

"Complaint: Intermittent noise, sounding like an r.f. or i.f. coil breaking down.

"The trouble was caused by a poor connection of the tuning condenser bonding strap at the riveted joint on the chassis. Solder the strap to chassis; and just to be sure that the other end of the strap under the condenser does not give trouble, run a second bond from the condenser frame to the joint just soldered."

Submitted by: Mr. Frank J. Overcash,
186 West Washington, Athens, Ohio

★ ★

FADA 1000 SERIES
Photofact 461-17, Set 1

"Here is a tip that may be useful to some Fada dealers. On the Model 1000 series Fada the dial cord may slip off the end of the shaft if the knob is turned after the pointer has reached the end of the dial. To remedy this, break away the wood from an old wooden knob and use the brass collar and set screw on the end of the shaft."

Submitted by: Mr. R. B. Turner,
1199 Chestnut Street, Newton Upper Falls, Massachusetts

★ ★

GENERAL INSTRUMENT CHANGER 204
Photofact 4713-34, Set 23

"Complaint: The changer does not shut off automatically.

"The trouble was found in the 'stop lever spring,' PHOTOFACT Item 62, which had lost its tension. Replace with a stiffer spring and the trouble will disappear."

★

CRESCENT CHANGER C-200
Photofact 4710-37, Set 20

"Complaint: Arm fails to lift after completion of record.

"The trouble was found in the 'reject catch,' PHOTOFACT Item 60A. When removed from the changer, small metal burrs were noticed on the edge of this part. After filing these burrs until the part was smooth, and replacing, the changer was found to operate properly."

Submitted by: Mr. Frank Teicher,
717 E. 175th Street, New York 57, New York

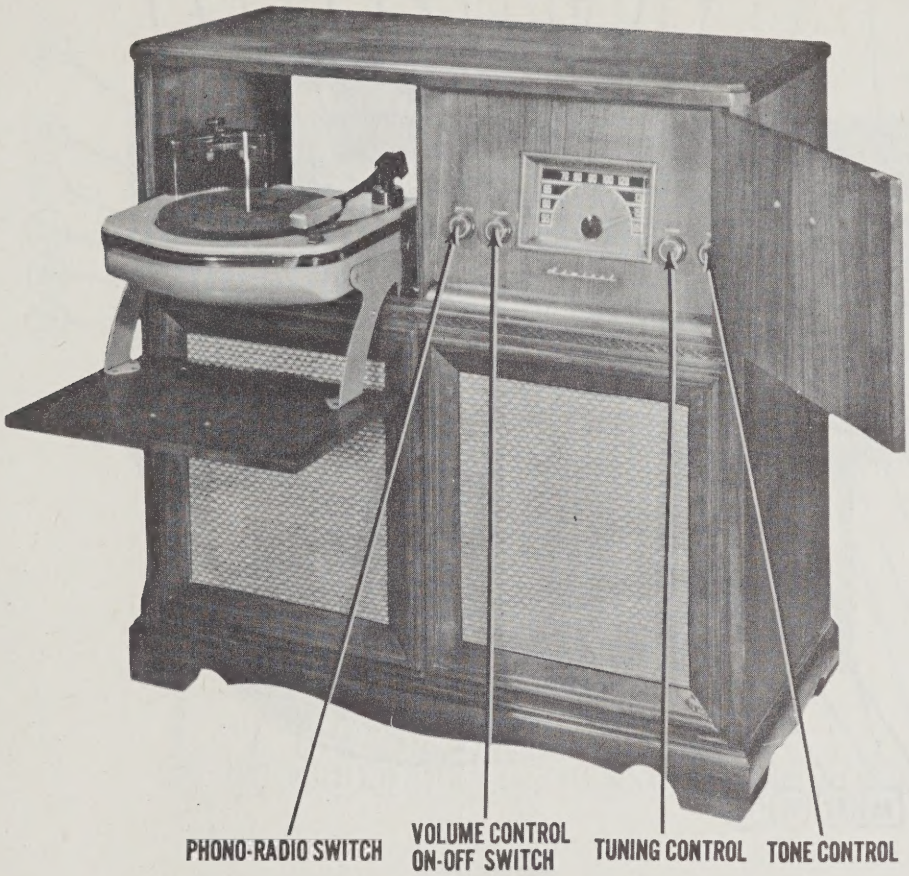
PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 4—Set No. 37	**April 16**
Volume 4—Set No. 38	**April 16**
Volume 4—Set No. 39	**May 15**
Volume 4—Set No. 40	**May 15**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

ADMIRAL MODELS 7C65B, 7C65M, 7C65W (Ch. 7E1)



ADMIRAL MODELS 7C65B, 7C65M, 7C65W (Ch. 7E1)

ADMIRAL MODEL 7C65W

TRADE NAME	Admiral, Model 7C65B, 7C65M, 7C65W (Chassis 7E1)
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SA7 Converter, 6SK7 IF Amp., 6SQ7 Det.-AVC-AF, 6SQ7 Phase Inv., (2) 6K6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1630KC RATING .48 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop must be connected during Steps 2, 3 & 4 below. During Step 1 loop terminals may be shorted together.

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2		Loop	1630KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.
4		"	600KC	"	"	A7	Adjust for maximum output. Repeat Step 3.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

ADMIRAL
MODEL 7C65W

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ADMIRAL PART No.	STANDARD REPLACEMENT		
1	Converter	6SA7	6SA7	8R	
2	IF Amp.	6SK7	6SK7	8N	
3	Det.-AVC-AF	6SQ7	6SQ7	8Q	
4	Phase Inv.	6SQ7	6SQ7	8Q	
5	Power Output	6K6GT	6K6GT	8Q	
6	" "	6K6GT	6K6GT	7S	
7	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ADMIRAL PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
8A	30	350	67C6-22	EL-330*	AF88J	UP3345	DY-2x30-450	▲ Filter
B	30	350						▲ "
9	.002	600	64B1-14	TC-22	684-002	DT6D2	S-6-002	Tone Compensation
10	.02	400	64B1-24	TC-12	484-02	DT4S2	S-4-02	Audio Coupling
11	.02	400	64B1-24	TC-12	484-02	DT4S2	S-4-02	" "
12	.02	600	64B1-24	TC-12	684-02	DT6S2	S-6-02	" "
13	.02	400	64B1-24	TC-12	484-02	DT4S2	S-4-02	Tone Comp.
14	.002	600	64B1-14	TC-22	684-002	DT6D2	S-6-002	" "
15	.05	400	64B1-22	TC-15	484-05	DT4S5	S-4-05	IF Plate Decoupling
16	.1	400	64B1-20	TC-1	484-.1	DT4P1	S-4-1	Screen Bypass
17	.1	200	64B1-30	TC-1	484-.1	DT2P1	S-2-1	AVC Filter
18	.001	600	64B1-15	TC-21	684-001	DT6D1	S-6-001	Phono Coupling
19	.25	200	64B1-28	TC-2	484-.25	DT2P25	S-2-25	Phono Decoupling
20	500	500	65B6-6	1FM-35	1468-0005	5W5T5	MO.5-35	AF Plate Bypass
21	100	500	65B6-3	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter
22	250	500	65B6-5	1FM-325	1468-00025	5W5T25	MO.5-325	" " "
23	50	500	65B6-4	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.
24	20	500	65B6-26	MS-42		5R5Q2	MOS.5-42	Fixed Trimmer-See Note
58	.002	600	64B1-14	TC-22	684-002	DT6D2	S-6-002	Audio Coupling
59	10	500	65B6-24	1FM-41	1468-00001	5W5Q1	MO.5-41	Fixed Trimmer-See Note

*Omit bypass section.
Note-Used in early production only.

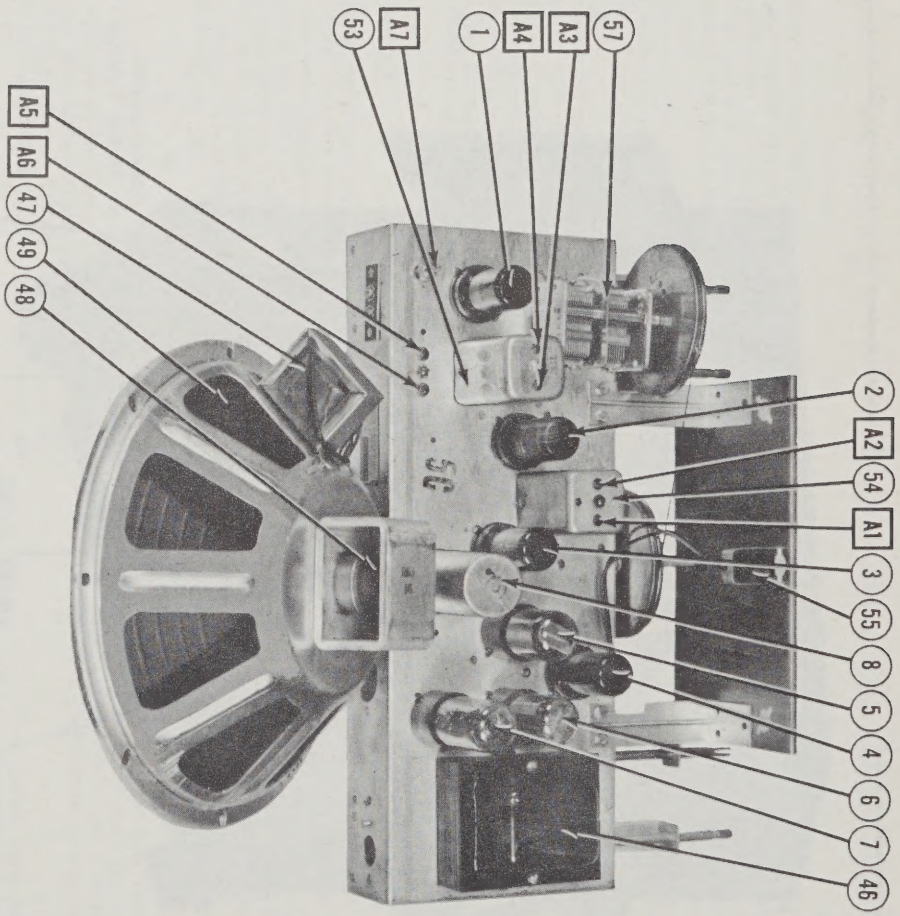
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No.	IRC PART No.	CLAROSTAT PART No.	
25A	1 Meg.	½	75B2-2	D19-137X	AT-112	Volume Control tapped @ 500KΩ
B	Shaft		Not Req.	E	KSS-5	Attach to 25A per instructions
C	Switch		" "	41	SW-A	" " " " "
26A	2 Meg.	½	75B1-8	D13-139	AM-83-S	Tone Control
B	Shaft		Not Req.	E	KSS-5	Attach to 26A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ADMIRAL PART No.	IRC PART No.	
27	22KΩ	½	60B8-223	BTS-22K	Red-Red-Or. Oscillator Grid
28	1 Meg.	½	60B8-105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
29	15KΩ	2	60B20-153	BT-2-15K	Br.-Grn.-Or. Screen Dropping
30	1000Ω	½	60B8-102	BTS-1000	Br.-Blk.-Red IF Plate Decoupling
31	47KΩ	½	60B8-473	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
32	220KΩ	½	60B8-224	BTS-220K	Red-Red-Yl. Diode Load
33	27KΩ	½	60B8-273	BTS-27K	Red-Vi.-Or. Tone Compensation
34	4.7 Meg.	½	60B8-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
35	270KΩ	½	60B8-274	BTS-270K	Red-Vi.-Yl. AF Plate Load
36	4.7 Meg.	½	60B8-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. Phase Inverter Grid
37	270KΩ	½	60B8-274	BTS-270K	Red-Vi.-Yl. Phase Inverter Plate Load
38	270KΩ	½	60B8-274	BTS-270K	Red-Vi.-Yl. Output Grid
39	270KΩ	½	60B8-274	BTS-270K	Red-Vi.-Yl. " "
40	270KΩ	½	60B8-274	BTS-270K	Red-Vi.-Yl. " "
41	680Ω	2	60B20-681	BT-2-680	Blue-Gray-Br. Output Cathode
42	1000Ω	2	60B20-102	BT-2-1000	Br.-Blk.-Red Filter
43	50Ω	5	61A1-6	AB-50	Surge Limiter
44	100KΩ	½	60B8-104	BTS-100K	Br.-Blk.-Yl. Voltage Dropping
45	120KΩ	½	60B8-124	BTS-120K	Br.-Red-Yl. Bleeder

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ADMIRAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
46	117V AC @ .48A	600V CT @ .06A	5.0V AC @ 2.0A	6.4V AC @ 2.3A	80B1	P-6312‡	T22R04‡	P-2952‡

‡Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ADMIRAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
47	12000Ω CT	4.2Ω	630Ω CT	.6Ω	98A34-10	A-3823	T22S47	A-2901	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ADMIRAL PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-119†		†Replace output transformer to match 6-8Ω voice coil.
48	PM	4.2Ω	78B29	Mod. P10-T	10A4†	
	CONE DIA.	VC DIA.				
49	9½"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	ADMIRAL PART No.	MEISSNER PART No.
50	Loop Ant.		.2Ω	95A18-2	
51	Loop Load. Coil		1.8Ω	69A26-1	
52	Osc. Coil		5.6Ω	69A14	14-1040
53	Input IF	20.1Ω	19.5Ω	72B46	16-5740
54	Output IF	21.8Ω	21.2Ω	72B47	16-5742

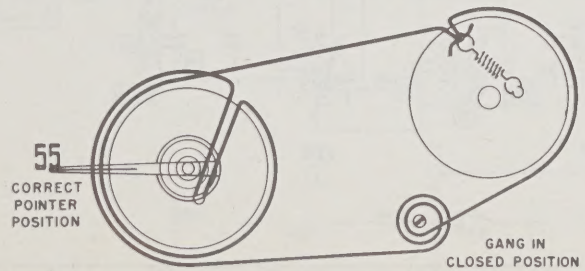
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					ADMIRAL PART No.		
55	Bayonet	6-8	0.15	Brown			Type 47

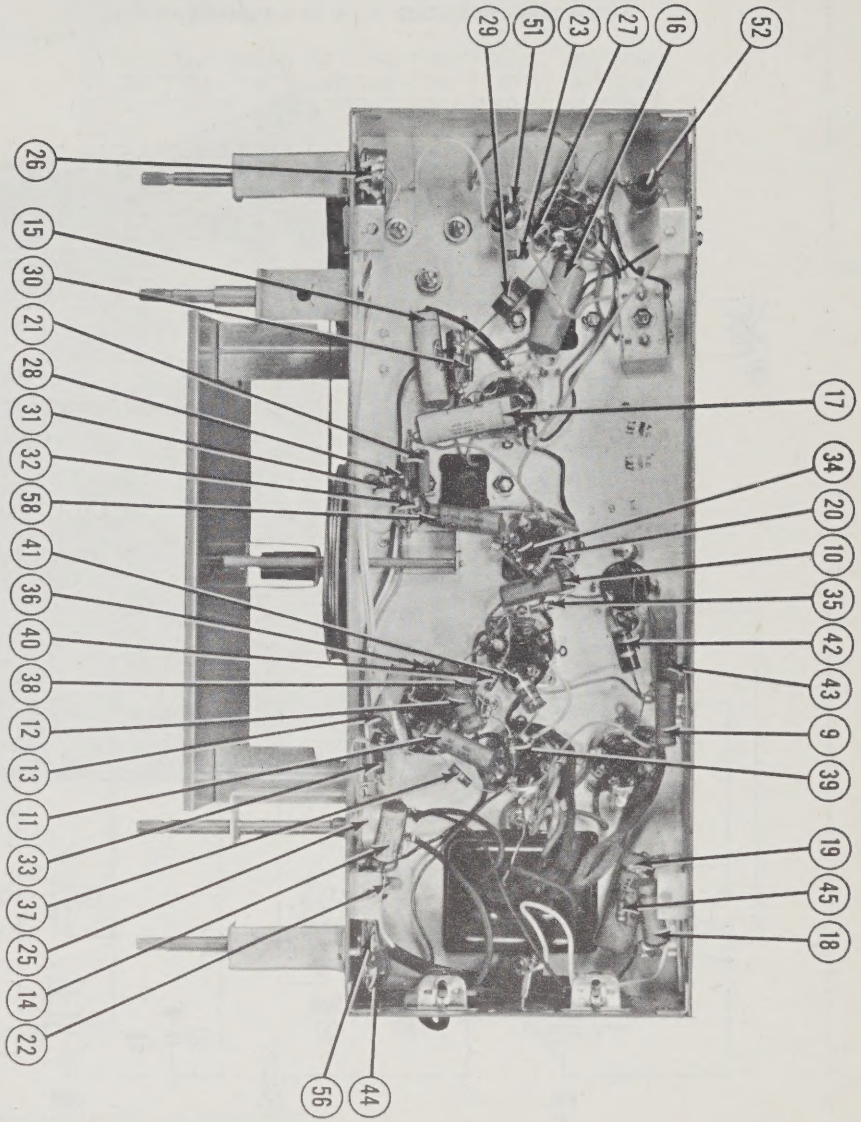
MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
56	Switch	77A16-2	Radio-Phono
57	2 Gang Var. Cap.	A1550	(12-448MMF, 9-176MMF)
A5	Dual Trimmer	66A1-10	Osc. Adj. (4-70MMF)
A6			Ant. Adj. (4-70MMF)
	Dial Scale	A1530	
	Dial Pointer	A1303	

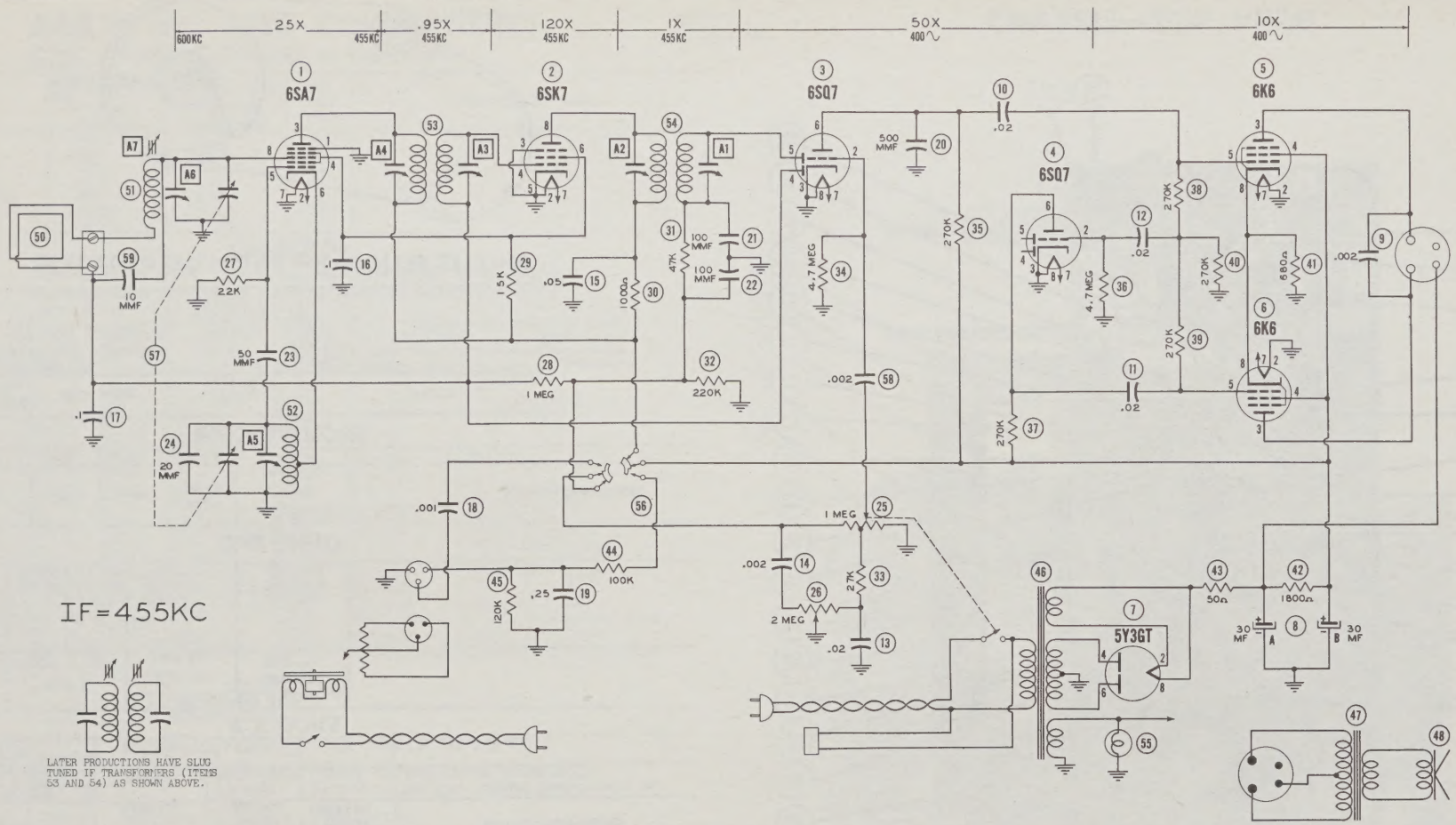
DIAL CORD STRINGING and POINTER SETTING



CHASSIS—BOTTOM VIEW



ADMIRAL MODEL 7C65W



RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	6.4VAC	250VDC	80VDC	-10VDC§	0V.	0V.	-.6VDC
2	6SK7	0V.	0V.	0V.	-.6VDC	0V.	80VDC	6.4VAC	250VDC
3	6SQ7	0V.	-.6VDC	0V.	-.6VDC	-.6VDC	105VDC	6.4VAC	0V.
4	6SQ7	0V.	-.6VDC	0V.	-.4VDC	-.4VDC	105VDC	6.4VAC	0V.
5	6K6GT	0V.	0V.	300VDC	255VDC	0V.	0V.	6.4VAC	23VDC
6	6K6GT	0V.	0V.	300VDC	255VDC	0V.	0V.	6.4VAC	23VDC
7	5Y3GT	0V.	310VDC	0V.	300VAC	0V.	300VAC	0V.	310VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0Ω	.1Ω	130KΩ	145KΩ	22KΩ	.5Ω	0Ω	1.2 Meg.
2	6SK7	0Ω	0Ω	0Ω	1.2 Meg.	0Ω	145KΩ	.1Ω	130KΩ
3	6SQ7	0Ω	5 Meg.	0Ω	1.2 Meg.	260KΩ	400KΩ	.1Ω	0Ω
4	6SQ7	0Ω	5 Meg.	0Ω	INF.	INF.	400KΩ	.1Ω	0Ω
5	6K6GT	INF.	0Ω	130KΩ	130KΩ	540KΩ	INF.	.1Ω	700Ω
6	6K6GT	INF.	0Ω	130KΩ	130KΩ	540KΩ	INF.	.1Ω	700Ω
7	5Y3GT	INF.	130KΩ	INF.	190Ω	INF.	180Ω	INF.	130KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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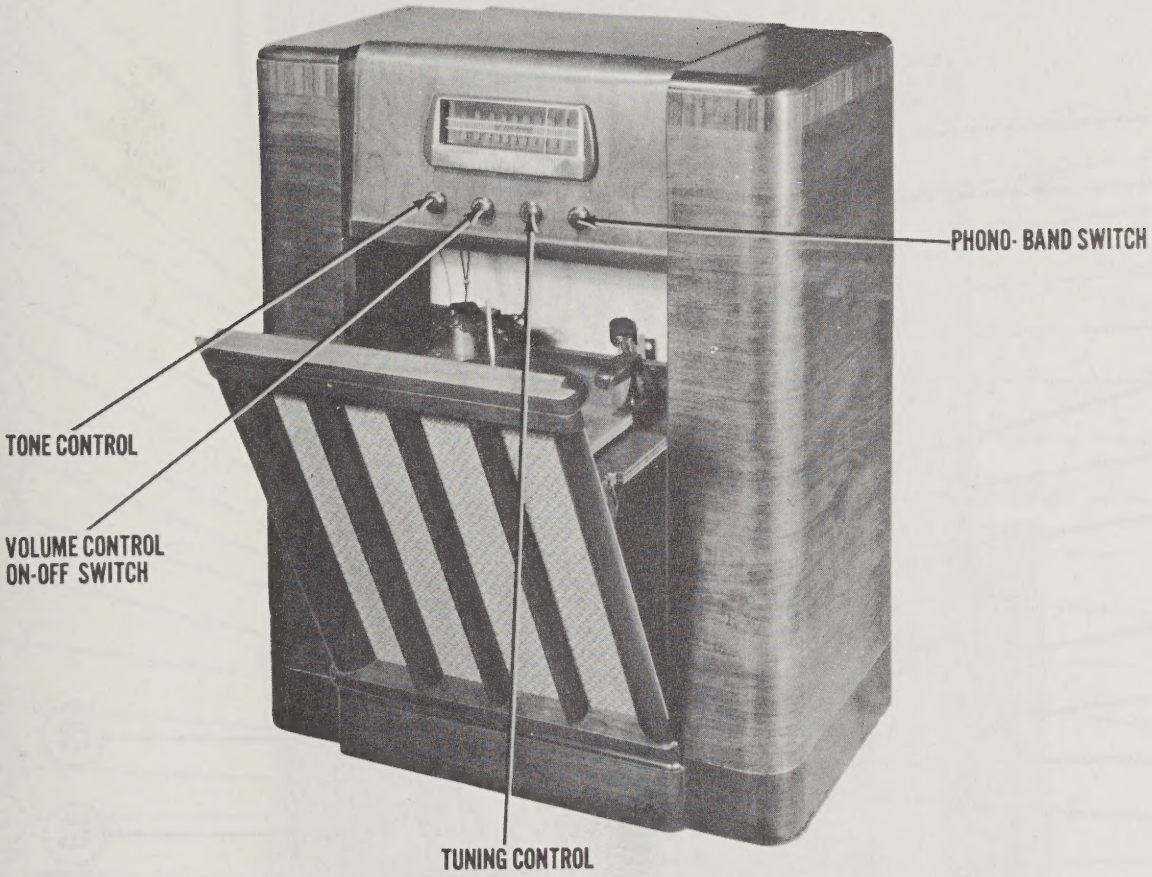
486-1

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

AIRLINE MODEL
84WG-2714A



AIRLINE MODEL
84WG-2714A

AIRLINE MODEL 84WG-2714A	
TRADE NAME	Airline, Model 84WG-2714A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver
TUBES (SEVEN)	Types, 6BE6 AM-FM Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 Ratio Det., 6AT6 AM Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .56 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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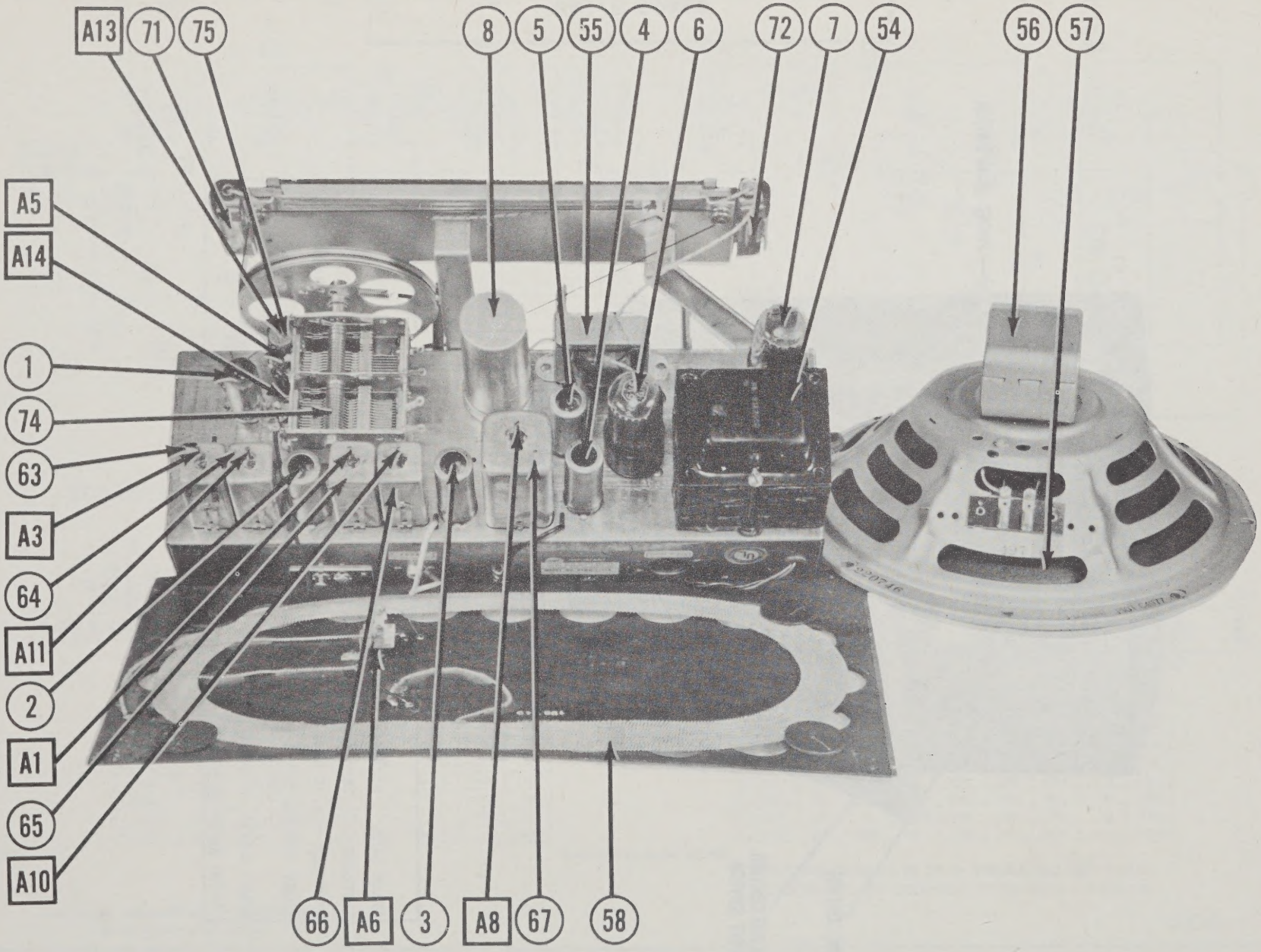
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AM-FM Converter	6BE6	6BE6	7CH	
2	1st IF Amp.	6BA6	6BA6	7BK	
3	2nd IF Amp.	6BA6	6BA6	7BK	
4	Ratio Det.	6AL5	6AL5	6BT	
5	AM Det.-AVC-AF	6AT6	6AT6	7BT	
6	Power Output	6V6GT	6V6GT	7AC	
7	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	350	45X359	8L-424		UP43145C	DY-406	◓ Filter
B	40	350						■ "
C	20	350						▲ "
D	20	25						Cathode Bypass
9	5	100	45X361	UT-41	PRS150-4	BR415	M-4-450	Stabilizing Cap.
10	.001	600	B66102	TC-21	684-001	DT6D1	S-6-001	Output Plate Bypass
11	.004	200	B66402	TC-24	484-004	DT6D4	S-6-004	Tone Comp.
12	.02	400	D66203	TC-12	484-02	DT4S2	S-4-02	Audio Coupling
13	.004	400	D66562	TC-24	484-004	DT6D4	S-6-004	" "
14	.04	400	B66403	TC-14	484-04	DT4S4	S-6-04	Tone Comp.
15	.05	200	B66503	TC-15	484-05	DT2S5	S-4-05	AVC Filter
16	.01	400	D66103	TC-11	484-01	DT4S1	S-4-01	Conv. Screen Decoup.
17	220		47X463	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
18	68		47X471	1FM-475	1468-000075	5W5Q7	MOS.5-47	Tone Comp.
19	470		47X510	1FM-35	1468-0005	5W5T5	MO.5-35	Diode Load Cap.
20	2700		47X402	1FM-23	1467-0025	1W5D25	MW.5-225	De-emphasis
21	5000		47X507	1FM-25	684-005	1D5D5	MW.5-25	2nd IF Decoupling
22	5000		47X507	1FM-25	684-005	1D5D5	MW.5-25	Cathode Bypass
23	5000		47X507	1FM-25	684-005	1D5D5	MW.5-25	1st IF Decoupling
24	5000		47X507	1FM-25	684-005	1D5D5	MW.5-25	1st IF Cathode Bypass
25	5000		47X507	1FM-25	684-005	1D5D5	MW.5-25	Conv. Plate Decoupling
26	10		47X512	MS-41	1469-00001	5R5A1	MOS.5-41	Fixed Trimmer
27	100		47X518	1FM-31	1468-0001	5W5T1	MO.5-31	Conv. Screen Bypass
28	5		47X513	MS-55	1468-000005	5W5V5	MO.5-55	Feedback
29	47		47X517	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.
30	500		47X508	1FM-35	1468-0005	5W5T5	MO.5-35	Filament Bypass
31A	50		*	1FM-45	1468-00005	5W5Q5	MO.5-45	Diode RF Filter
B	50		*	1FM-45	1468-00005	5W5Q5	MO.5-45	" " "
75	100		47X511	MS-31	1469-0001	5R5T1	MOS.5-31	Fixed Padder

*Items 31A, 31B and 76 are part of resistor, capacitor combination part #76X1.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
32A	500KΩ	½	36X372	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 32A per instructions
C	Switch		" "	41	SW-A	" " " " "
33A	3 Meg.	½	40X235	D13-140	AM-67-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 33A per instructions

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: MEISSNER PART No.
58	Loop Ant.	.1Ω	.8Ω	26A475	
59	FM Ant.		0Ω	9A1900	
60	FM Ant.Coil		0Ω	9A1956	
61	AM Osc. "	.5Ω	5.1Ω	9A1929	14-1040
62	FM " "		0Ω	9A1938	
63	AM Input IF	15.5Ω	15.1Ω	9A1934	16-6668
64	FM " "	.6Ω	.1Ω	9A1932	
65	AM OutputIF	14.8Ω	14.8Ω	9A1935	16-6669
66	FM " "	.6Ω	.1Ω	9A1933	
67	Disc.Trans.	.9Ω	.1Ω	9A1936	
68	RF Choke		.3Ω	9A1882	
69	" "		.3Ω	9A1882	
70	Parasitic Choke		0Ω	9A1940	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA	INSTALLATION NOTES
71	Bayonet	6-8	0.15	Brown	7A103		Type 47
72	"	6-8	0.15	"	7A103		" "

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
73	Switch	2A375	Band-Phono
74	2 Gang Var. Cap.	14A198	(18-534MMF, 30-206MMF)
A13	Trimmer	17A247	FM Osc. Adj.
	Dial Glass	58X699	
	Dial Pointer	15X241	
	Escutcheon	4X999	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	
34	22KΩ	½	B84223	BTS-22K	Red-Red-Or. Oscillator Grid
35	3900Ω	½	B83392	BTS-3900	Or.-White-Red Converter Screen Decoupling
36	1200Ω	½	B84122	BTS-1200	Br.-Red-Red Converter Plate Decoupling
37	8200Ω	2	B84822	BT-2-8200	Gray-Red-Red Bleeder
38	1200Ω	½	B84122	BTS-1200	Br.-Red-Red 1st IF Decoupling
39	68Ω	½	B83680	BW-½-68	Blue-Gray-Blk. 1st IF Cathode
40	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
41	68Ω	½	B83680	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
42	1000Ω	½	B84102	BTS-1000	Br.-Blk.-Red 2nd IF Plate Load
43	27KΩ	½	B84273	BTS-27K	Red-Vi.-Or. De-emphasis
44	6800Ω	½	B84682	BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
45	6800Ω	½	B84682	BTS-6800	Blue-Gray-Red " " " "
46	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
47	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Series Phono
48	15KΩ	½	B84153	BTS-15K	Br.-Grn.-Or. Tone Compensation
49	10 Meg.	½	B85106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
50	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
51	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Output Grid
52	270Ω	½	B84271	BW-½-270	Red-Vi.-Br. Output Cathode
53A	1000Ω	10	{B85474}	AB-1000	Filter
B	1400Ω			AB-1500	"
76	47KΩ	½	*	BTS-47K	Yl.-Vi.-Or. Diode RF Filter

*Items 31A, 31B and 76 are part of capacitor, resistor combination part #76X1.

TRANSFORMER (POWER)

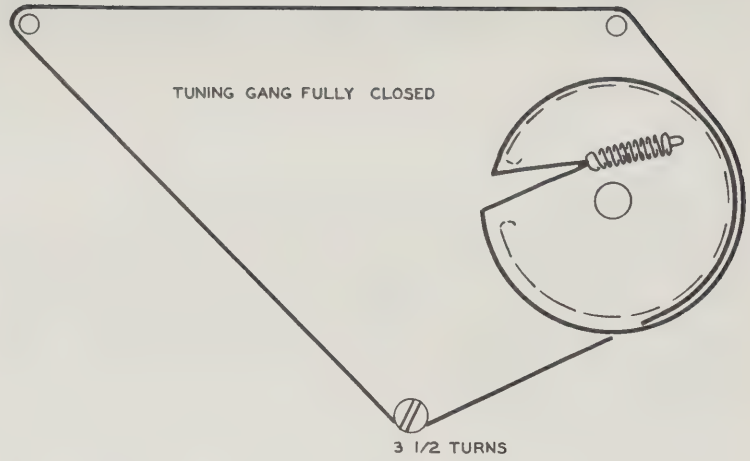
ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
54	117V AC @ .56A	510V CT @ .084A	5.0V AC @ 2.0A	6.4V AC @ 2.5A	53X290			

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
55	5500Ω	3.4Ω	475Ω	1.1Ω	51X134	A-3849	T22S87	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
56	FIELD PM	VC IMP. 3.4Ω	12A480	ST-119† Mod. P10-T	10A31	†Replace output transformer to match 6-8Ω voice coil.
57	CONE DIA. 9-1/2"	VC DIA. 1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			



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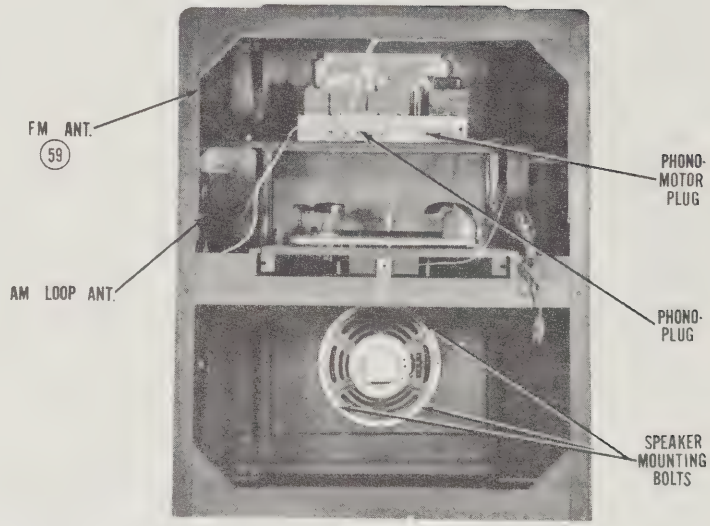
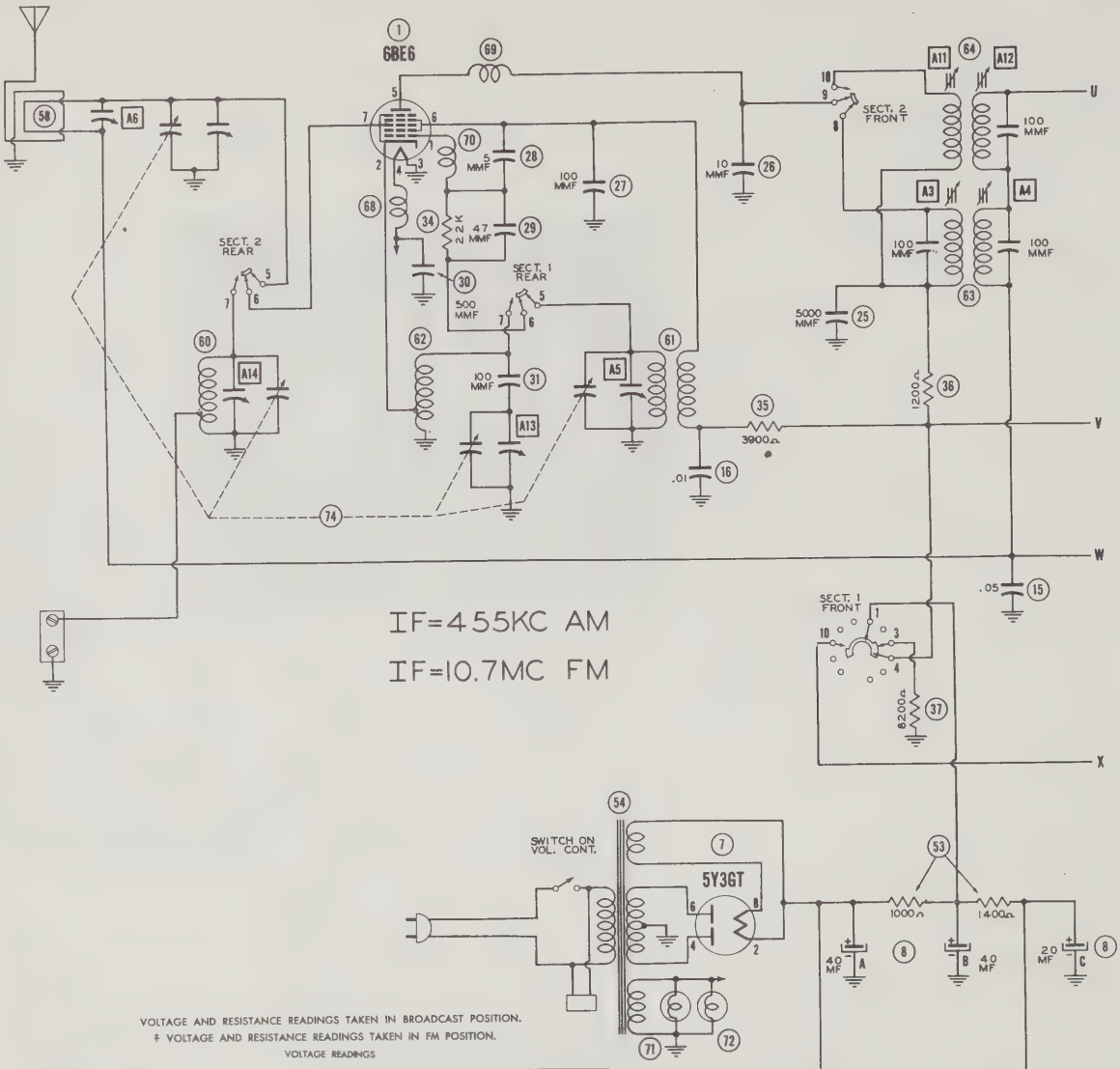


DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-motor & phono pickup plug from chassis.
3. Remove FM dipole lead from chassis.
4. Remove loop antenna leads from loop antenna.
5. Remove speaker plug from speaker.
6. Remove three hex head screws holding chassis in cabinet. Remove chassis from cabinet.
7. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

DATE 2/48-#496-2
SET #36-FOLDER #496-2



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	-11.5VDC	0V.	0V.	6.3VAC	141VDC	117VDC	0V.	-
2	6BA6	-.1VDC	0V.	0V.	6.4VAC	127VDC	127VDC	1.2VDC	-
‡ 3	6BA6	0V.	0V.	0V.	6.4VAC	125VDC	125VDC	1.2VDC	-
‡ 4	6AL5	-3VDC	3VDC	0V.	6.4VAC	.6VDC	0V.	-.3VDC	-
5	6AT6	-.7VDC	0V.	6.4VAC	0V.	-.4VDC	-.4VDC	60VDC	-
6	6V6GT	0V.	6.4VAC	250VDC	200VDC	0V.	0V.	0V.	9VDC
7	5Y3GT	0V.	260VDC	0V.	255VAC	0V.	255VAC	0V.	260VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	22KΩ	0Ω	0Ω	.4Ω	9.4KΩ	12KΩ	0Ω	-
2	6BA6	1 Meg.	0Ω	0Ω	.1Ω	9.4KΩ	9.4KΩ	68Ω	-
‡ 3	6BA6	.1Ω	0Ω	0Ω	.1Ω	400KΩ	400KΩ	68Ω	-
‡ 4	6AL5	350KΩ	350KΩ	0Ω	.1Ω	6KΩ	INF.	6KΩ	-
5	6AT6	10 Meg.	0Ω	.1Ω	0Ω	340KΩ	340KΩ	480KΩ	-
6	6V6GT	INF.	.1Ω	10KΩ	9KΩ	470KΩ	1Ω	0Ω	250Ω
7	5Y3GT	INF.	10KΩ	INF.	97Ω	INF.	100Ω	INF.	10KΩ

RESISTANCE READINGS IN THE b+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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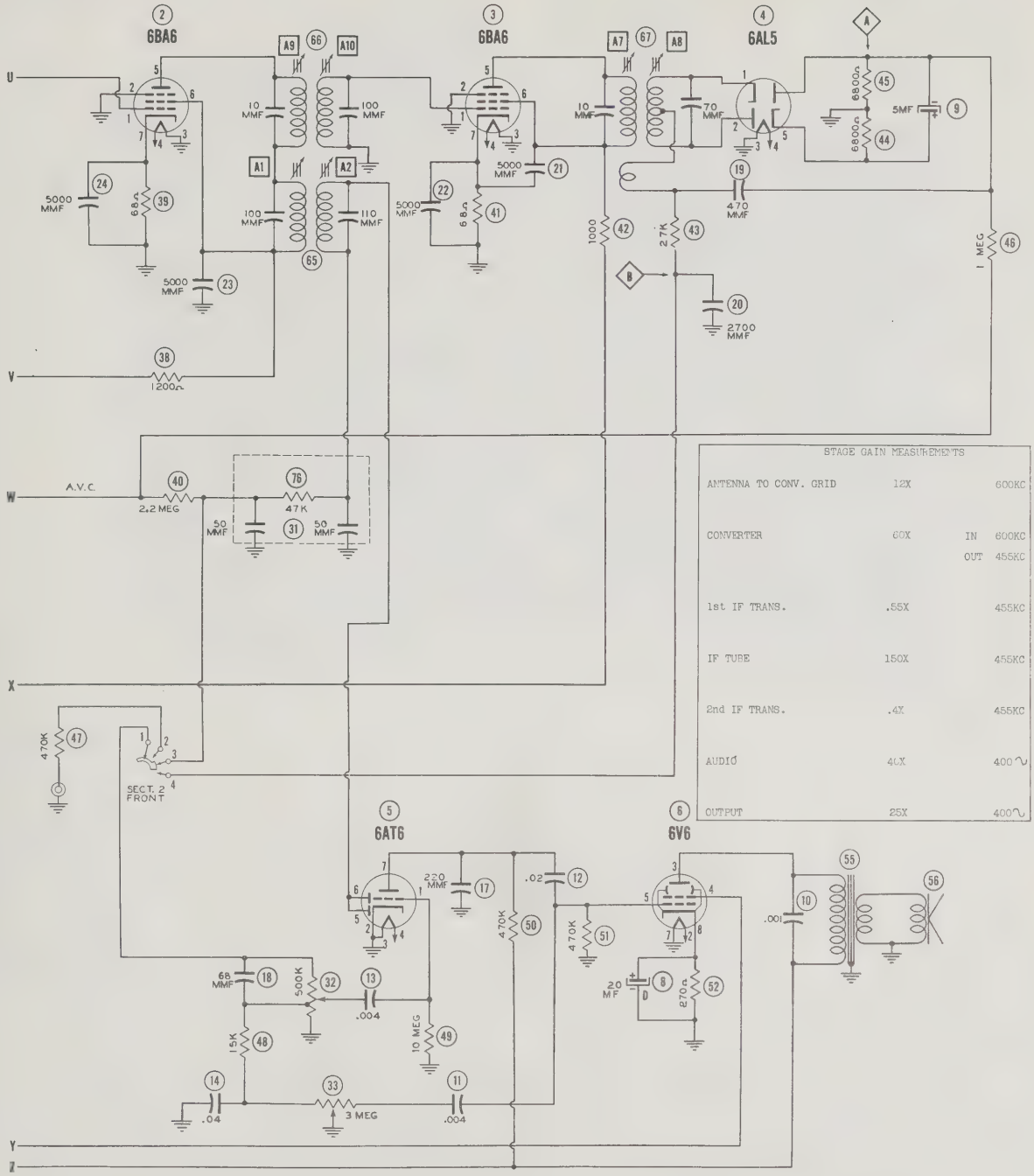
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



STAGE GAIN MEASUREMENTS

ANTENNA TO CONV. GRID	12X		600KC
CONVERTER	60X	IN	600KC
		OUT	455KC
1st IF TRANS.	.55X		455KC
IF TUBE	150X		455KC
2nd IF TRANS.	.4X		455KC
AUDIO	40X		400 ~
OUTPUT	25X		400 ~

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.
Allow receiver and signal generator to warm up for about 15 minutes prior to attempting alignment.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) 6BA6 IF Tube (2). Low side to chassis.	455KC	BC (center position)	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output.
2	.1 MFD.	High side to Pin 7 (grid) 6BE6. Low side to chassis.	455KC	"	"	"	A3,A4.	" " " "
3	.1 MFD.	"	1620KC	"	"	"	A5	" " " "
4	50MMFD	High side to ext. ant. clip. Low side to chassis.	1400KC	"	Tune for maximum output.	"	A6	Adjust for maximum output. Set pointer to 1400KC calibration mark. (Trimmers on ant. stator of tuning cap. are factory adjustments and ordinarily need not be changed.)

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD.	High side to Pin 1 (grid) 6BA6 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	FM (fully clockwise)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A7	Adjust for maximum deflection.
6	.01 MFD	"	"	"	"	DC probe to Point (B). Common to chassis	A8	Use a zero centered VTVM if available. Adjust for zero deflection. Repeat Steps 5 & 6 until no further improvement can be made.
7	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (2). Low side to chassis.	"	"	"	DC probe to Point (A). Common to chassis	A9,A10	Adjust for maximum deflection. Attenuate signal to give same maximum reading as obtained in Step 5.
8	.01 MFD	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	"	A11, A12	"
9	300Ω carbon res.	Disconnect built in FM ant. lead. High side sig. gen. in series with 300Ω resistor to ungrounded FM ant. terminal Low side to chassis.	108.5MC (unmodulated)	"	"	"	A13	Adjust for maximum deflection.
10	"	"	104.5MC (unmodulated)	"	Tune for maximum deflection.	"	A14	Rock tuning cap. and adjust for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube. Low side to chassis.	10.7MC (Freq. modulated)	FM (fully clockwise)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A7, A10, A9	Disconnect 5 MFD cap. from Point (A). Adjust A7, A10 & A9 for maximum amplituue, symmetry & coincidence of pattern per Fig. 1.
6	.01 MFD	Disconnect lead from Pin 7 (grid) 6BE6 to switch. Connect 100KΩ resistor from Pin 7 to chassis making leads as short as possible. High side of sig. gen. to Pin 7. Low side to chassis.	"	"	"	"	A12, A11	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
7	.01 MFD	Remove 100KΩ resistor from Step 6. Reconnect Pin 7 6BE6 to switch. High side to Pin 1 (grid) 6BA6 1st IF Tube. Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A8	Reconnect 5 MFD to Point (A). Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of Pattern of Fig. 2.
8	300Ω carbon res.	Remove built in FM Ant. lead from FM ant. terminal strip. High side of sig. gen. to ungrounded FM ant. terminal. Low side to chassis.	108.5MC (Freq. Mod.)	"	"	Vertical input to Point (A). Ground to chassis.	A13	Disconnect 5 MFD cap. from Point (A). Adjust A13 for coincidence of pattern of Fig. 1.
9	"	"	104.5MC (Freq. Mod.)	"	Tune for coincidence.	"	A14	Adjust for maximum amplitude of pattern of Fig. 1. Repeat Steps 8 & 9 until no further improvement can be made. Reconnect 5 MFD cap. to Point (A).

FIG. 1

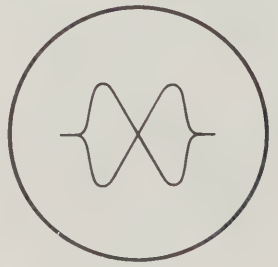
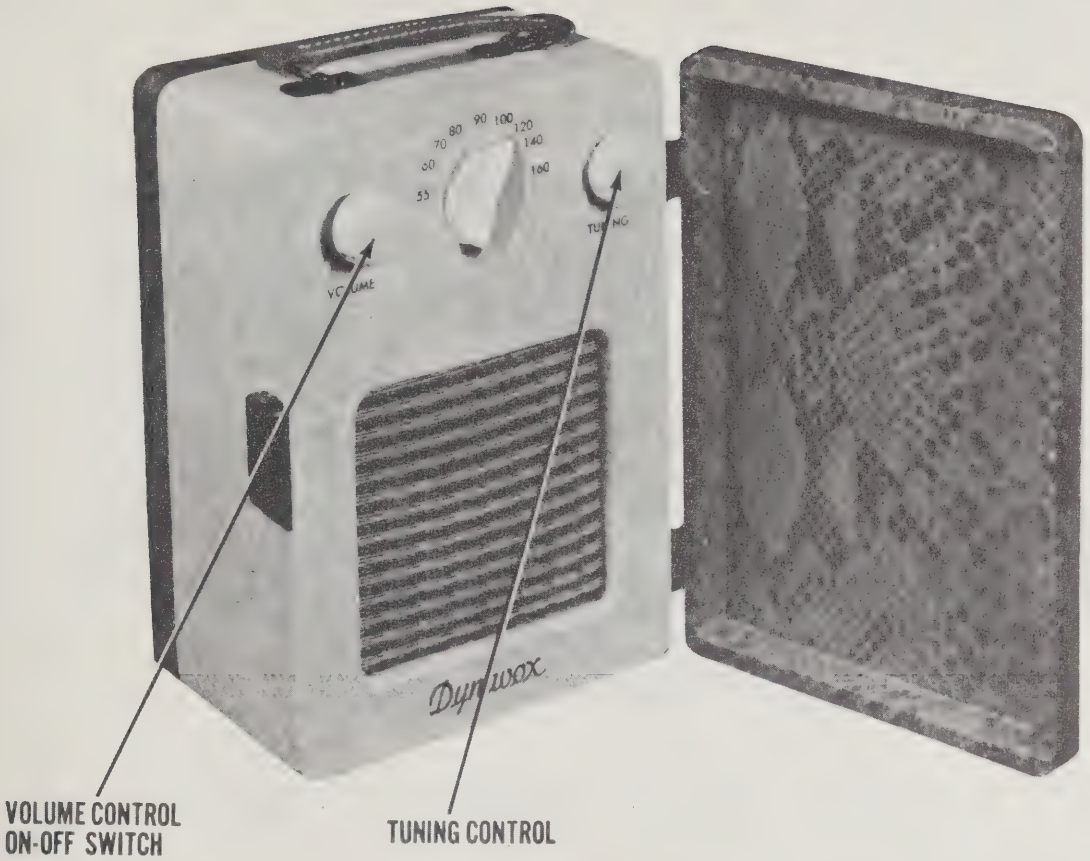


FIG. 2

DYNAVOX MODEL 3-P-801
BATTERY-LINE OPERATED

DYNAVOX MODEL 3-P-801
BATTERY-LINE OPERATED



DYNAVOX MODEL 3-P-801
BATTERY-LINE OPERATED

DYNAVOX MODEL 3-P-801

TRADE NAME	Dynavox, Model 3-P-801
MANUFACTURER	Dynavox Corp., 40-35 21st St., Long Island City, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output.
POWER SUPPLY	110-120 Volts AC-DC or 1.5 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	.14 Amp. @ 117 Volts AC or 260MA @ 1.5 Volts DC and 9.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Extend leads for loop connection making leads as short as possible.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200MMF to reduce hum modulation.
2	.1 MFD.	"	1700KC	"	"	A5	Adjust for maximum output.
3		Loop	1500KC	"	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4		"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.

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PARTS LIST AND DESCRIPTIONS

DYNAVOX MODEL 3-P-801

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DYNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DYNAVOX PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	50	150			TA-530	PRSA503010	UP4CJ62	Filter - Red
B	30	150						" - Yl.
C	200	15			UHC-215			Filament Bypass-Grn.
6	.02	150		TTR-1.5-02			ZNW2S2	Line Filter
7	.005	400		TTR-1.5-006			ZYW2D5	Output Plate Bypass
8	.02	400		TTR-1.5-02			ZNW2S2	RF Bypass Pwr. Supply
9	.05	150		TTR-1.5-05			ZNW1S5	Filament Bypass
10	.005	400		TTR-1.5-006			ZYW2D5	Audio Coupling
11	.02	150		TTR-1.5-02			ZNW2S2	AF Screen Bypass
12	.005	400		QA1M-6-.006			ZYW2D5	Audio Coupling
13	.02	150		TTR-1.5-02			ZNW4D5	IF Screen Bypass
14	.02	200		TTR-1.5-02			ZNW2S2	AVC Filter
15	.02	150		TTR-1.5-02			ZNW2S2	Conv. Screen Decoup.
16	.0001	100		MO.5-31			5W5T1	AF Plate Bypass
17	.0001	100		MO.5-31			5W5T1	Diode RF Filter
18	.05	150		TTR-1.5-05			ZNW1S5	Filament Bypass

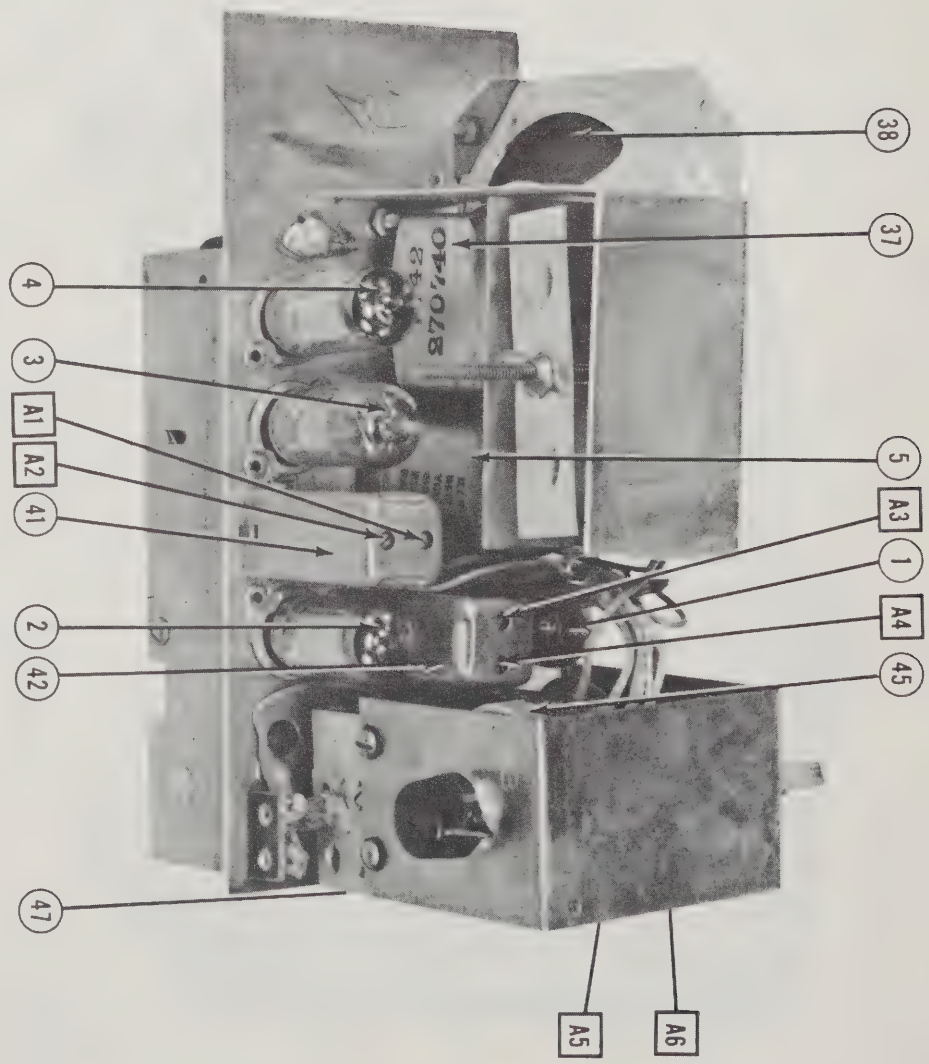
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DYNAVOX PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
19A	750KΩ	½		D13-133	M-79-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 19A per instructions
C	Switch			42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DYNAVOX PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
20	100Ω	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
21	22KΩ	½		BTS-22K	Red-Red-Or. Converter Screen Decoupling
22	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
23	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. " "
24	22KΩ	½		BTS-22K	Red-Red-Or. IF Screen Dropping
25	68KΩ	½		BTS-68K	Blue-Gray-Or. Diode RF Filter
26	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AF Grid
27	5.1 Meg.	½		BTS-4.7 Meg.	Grn.-Br. Grn. AF Screen Dropping
28	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
29	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Output Grid
30	470Ω	½		BTS-470	Yl.-Vi.-Br. Filament String
31	560Ω	½		BTS-560	Grn.-Blue-Br. " "
32	2500Ω	10		AB-2500	Filament Dropping
33	430Ω	½		BTS-470	Yl.-Or.-Br. Bias
34	2000Ω	1		BTA-2200	Red-Blk.-Red Filter
35	75Ω	2		BW-2-68	Vi.-Grn.-Blk. Surge Limiter
48	100KΩ	½		BTS-100K	Br.-Blk.-Yl. IF Trans. Shunt

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DYNAVOX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
36	8300Ω	3.6Ω	570Ω	.7Ω				A-2998	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DYNAVOX PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
37	PM	3.6Ω			4A07	
	CONE DIA.	VC DIA.				
38	4"	1/2"	CONE HAS SPECIAL ADJUSTMENT FEATURE			

R F COILS

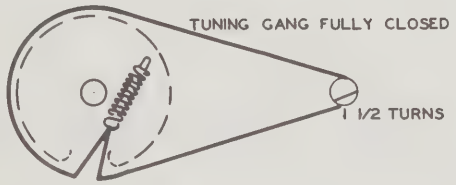
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	DYNAVOX PART No.	MEISSNER PART No.
39	Loop Ant.		3Ω		
40	Osc. Coil	1.5Ω	6.2Ω		
41	Input IF	18Ω	17.1Ω		16-6668
42	Output IF	21.5Ω	21.8Ω		16-6669

BATTERIES

ITEM No.	VOLTAGE	DYNAVOX PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
43	1.5V "A"		#950			#2R			2 Used in parallel
44	67.5V "B"			#467			#XX-45		

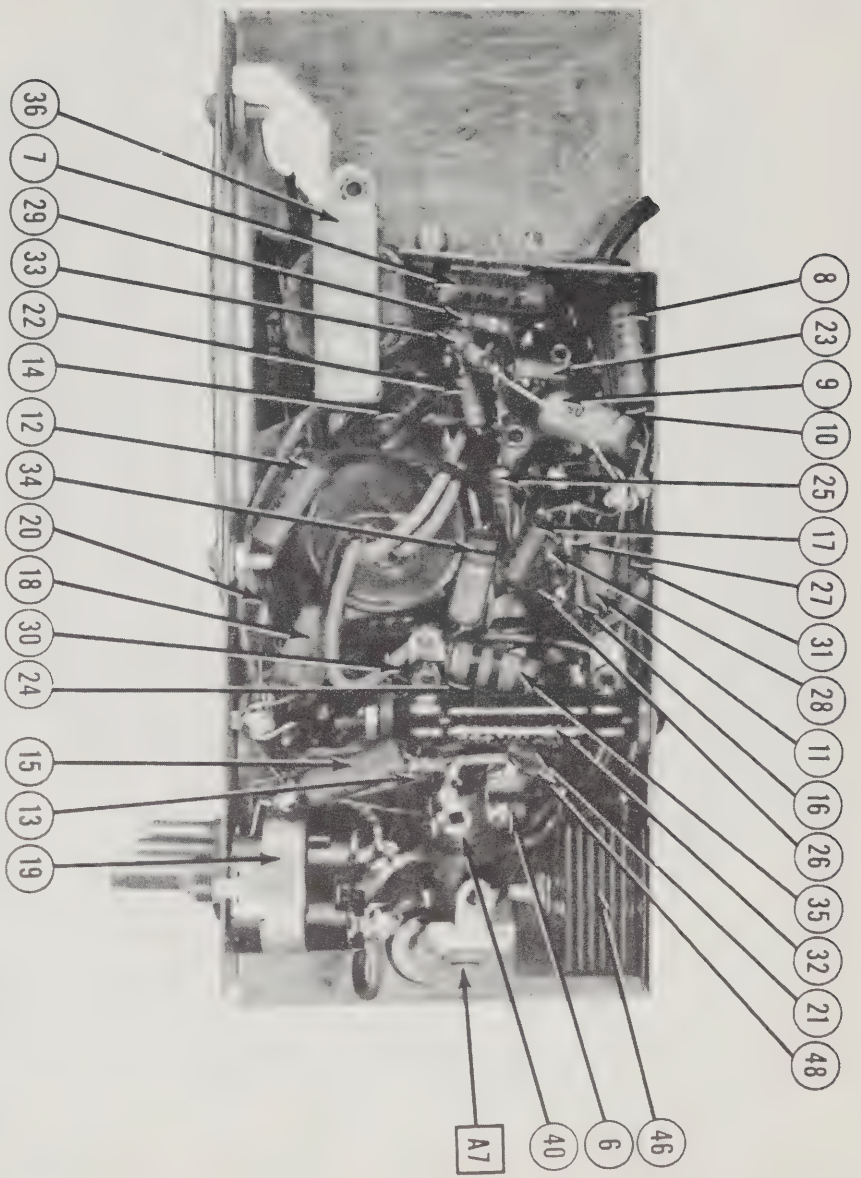
MISCELLANEOUS

ITEM No.	PART NAME	DYNAVOX PART No.	NOTES
45	Switch		AC-DC-Batt.
46	Rectifier		Selenium
47	2 Gang Var. Cap.		(18-335MMF, 18-239MMF)

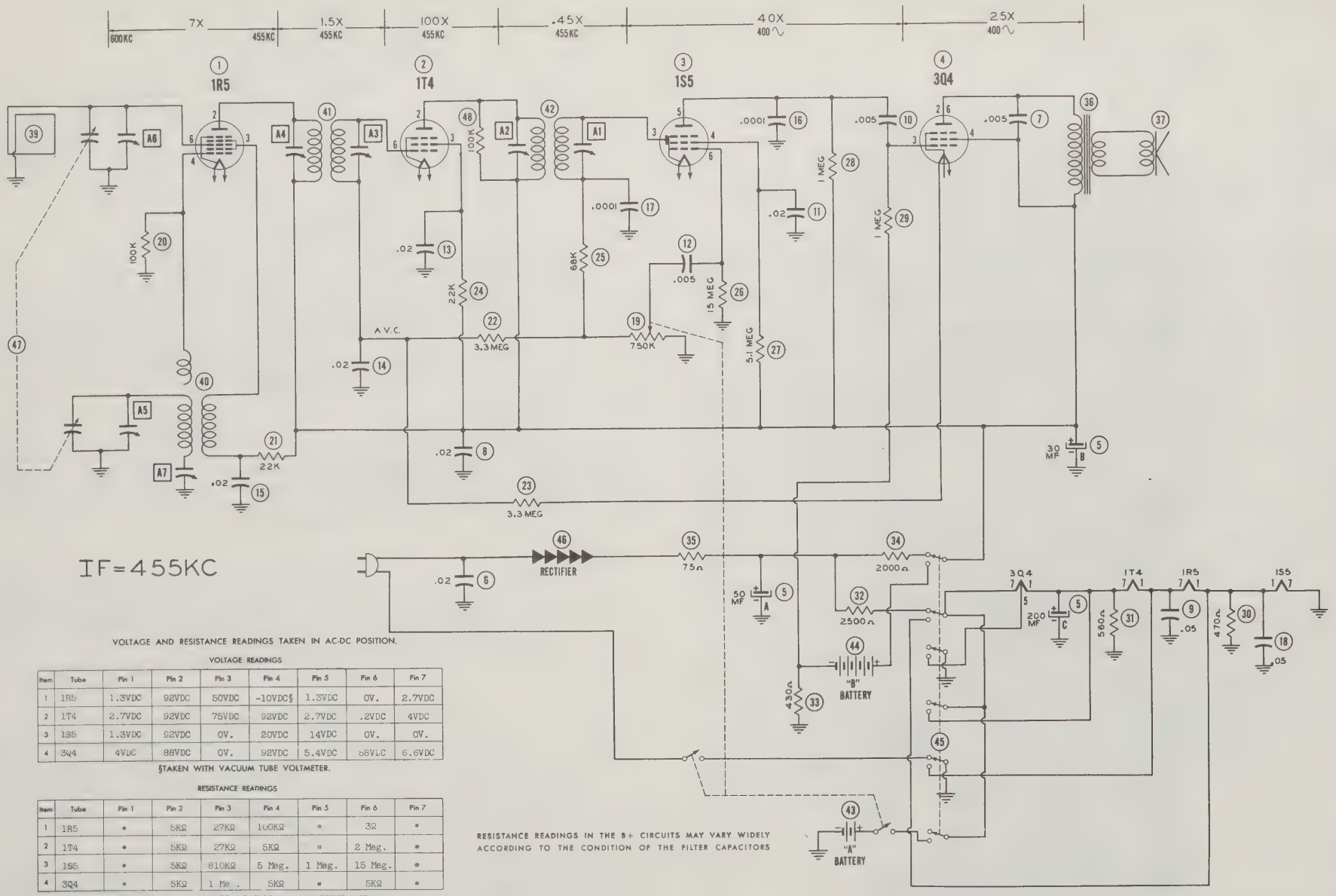


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



DYNAVOX MODEL 2-P-801



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.3VDC	92VDC	50VDC	-10VDC§	1.3VDC	0V.	2.7VDC
2	1T4	2.7VDC	92VDC	75VDC	92VDC	2.7VDC	.2VDC	4VDC
3	1S5	1.3VDC	92VDC	0V.	20VDC	14VDC	0V.	0V.
4	3Q4	4VDC	88VDC	0V.	92VDC	5.4VDC	88VDC	6.6VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	5KΩ	27KΩ	100KΩ	*	3Ω	*
2	1T4	*	5KΩ	27KΩ	5KΩ	*	2 Meg.	*
3	1S5	*	5KΩ	810KΩ	5 Meg.	1 Meg.	15 Meg.	*
4	3Q4	*	5KΩ	1 Meg.	5KΩ	*	5KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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486-3

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

CROSLEY
MODELS 58TA, 58TL

CROSLEY
MODELS 58TA, 58TL

CROSLEY MODEL 58TL

TRADE NAME	Crosley, Model 58TA, 58TL
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 14Q7 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 Power Output, 35Y4 Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to ext. ant. lead. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD	"	1620KC	"	"	A5	" " " "
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "

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PARTS LIST AND DESCRIPTIONS

CROSLEY MODEL 58TL

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	14Q7	14Q7	8AL	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	50	150	B-136770	TA-530	PRSA150-30-50	EDL5315	DSB-5030-150	Filter-Red
B	30	150						" -Blue
7	.05	200	39001-17	TC-15	484-05	DT2S5	MPH-4-05	Line Filter
8	.02	400	39001-80	TC-12	484-02	DT4S2	S-4-02	Output Plate Bypass
9	.02	200	39001-80	TC-12	484-02	DT2S2	S-4-02	Audio Coupling
10	.00025	600	39001-73	TC-325	1468-00025	DT6T25	S-6-00025	AF Plate Bypass
11	.003	600	39001-76	TC-23	684-003	DT6D3	S-6-003	Audio Coupling
12	.05	200	39001-17	TC-15	484-05	DT2S5	S-4-05	Line Isolation
13	.05	200	39001-17	TC-15	484-05	DT2S5	S-4-05	AVC Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	1 Meg.	½	B135127	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 14A per instructions
C	Switch		" "	41	SW-A	" " " " "

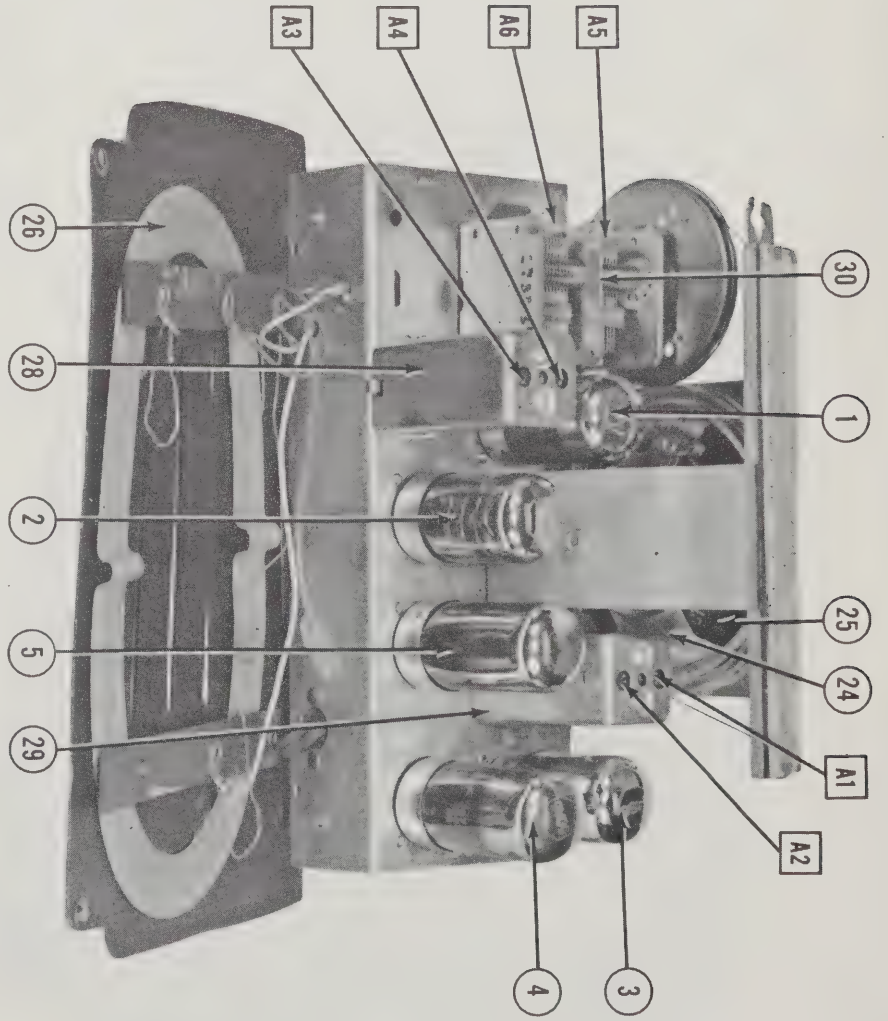
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
15	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Oscillator Grid
16	3.3 Meg.	½	39373-100	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
17	5 Meg.	½		BTS-4.7 Meg.	Grn.-Blk.-Grn. AF Grid
18	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
19	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
20	150Ω	½	39373-16	BW-½-150	Br.-Grn.-Br. Output Cathode
21	1200Ω	1	39373-144	BTA-1200	Br.-Red-Red Filter
22	47Ω	1	W-137367	BW-1-47	Yl.-Vi.-Blk. Surge Limiter

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
23	2100Ω	3.7Ω	230Ω	1Ω	B-137723	A-3876*	T22S45*	A-2928*	*File mounting holes to fit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

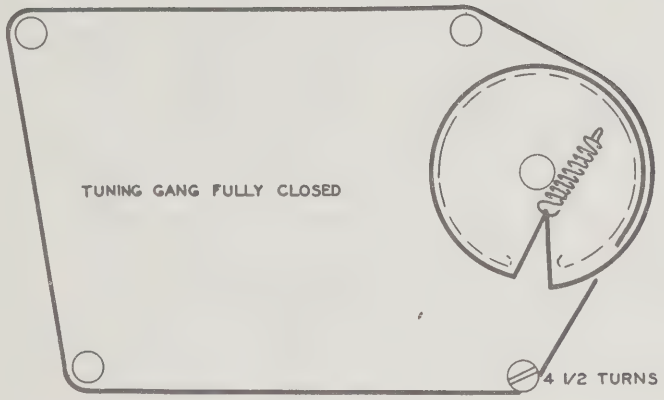
ITEM No.	RATINGS		REPLACEMENT DATA: CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113†		
24	PM	3.7Ω	AD-138459	Mod. P4-X	4A07†	†Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
25	4"	1/2"	NOT READILY	REPLACEABLE-USE COMPLETE SPEAKER UNIT		

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: MEISSNER PART No.	
26	Loop Ant.	.1Ω	1Ω	AC-139795		
27	Osc. Coil	.5Ω	6Ω	AW-139584	14-1060‡	‡Add 50MMFD from osc. grid to high side tuning cap.
28	Input IF	32Ω	34Ω	AC-139571	16-6658	
29	Output IF	32Ω		AC-139572	16-6670	

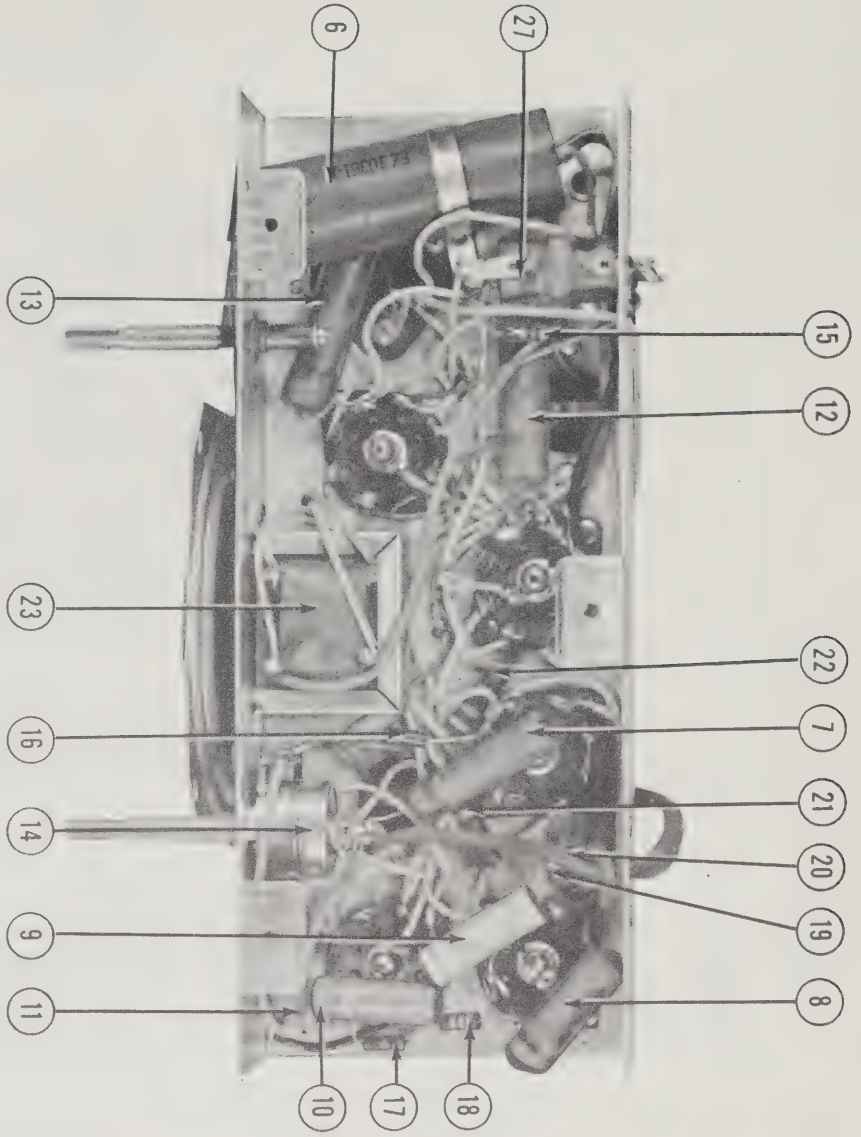
MISCELLANEOUS

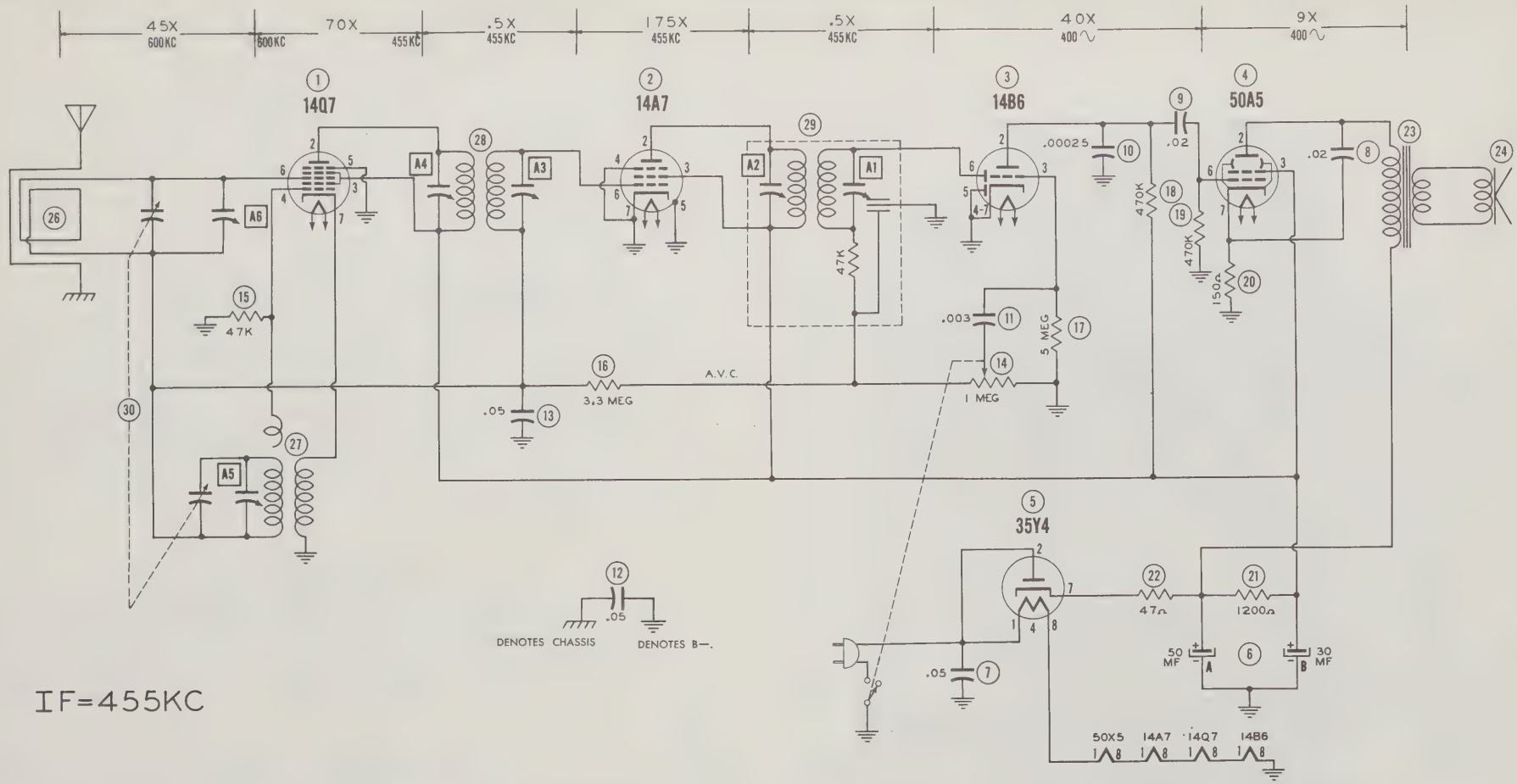
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
30	2 Gang Var. Cap.	AC137073-15	(35-462MMF, 32-197MMF)
	Dial	B-139605	Glass
	Dial Pointer	W-139532	
	Knob	B-138540-1	58TA
	"	B-138540-2	58TL



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	23VAC	87VDC	87VDC	-10VDC§	0V.	-.4VDC	0V.	11VAC
2	14A7	36VAC	87VDC	87VDC	0V.	0V.	-.4VDC	0V.	23VAC
3	14B6	11VAC	50VDC	-.55VDC	0V.	0V.	-.6VDC	0V.	0V.
4	50A5	87VAC	117VDC	87VDC	0V.	87VDC	0V.	5.2VDC	36VAC
5	35Y4	117VAC	117VAC	0V.	110VAC	122VDC	0V.	125VDC	87VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	24Ω	250KΩ	250KΩ	47KΩ	0Ω	4.5 Meg.	.5Ω	12Ω
2	14A7	36Ω	250KΩ	250KΩ	0Ω	0Ω	4.5 Meg.	0Ω	24Ω
3	14B6	12Ω	720KΩ	4.7 Meg.	0Ω	0Ω	1 Meg.	0Ω	0Ω
4	50A5	82Ω	250KΩ	250KΩ	INF.	250KΩ	470KΩ	130Ω	36Ω
5	35Y4	115Ω	115Ω	0Ω	110Ω	250KΩ	500KΩ	250KΩ	32Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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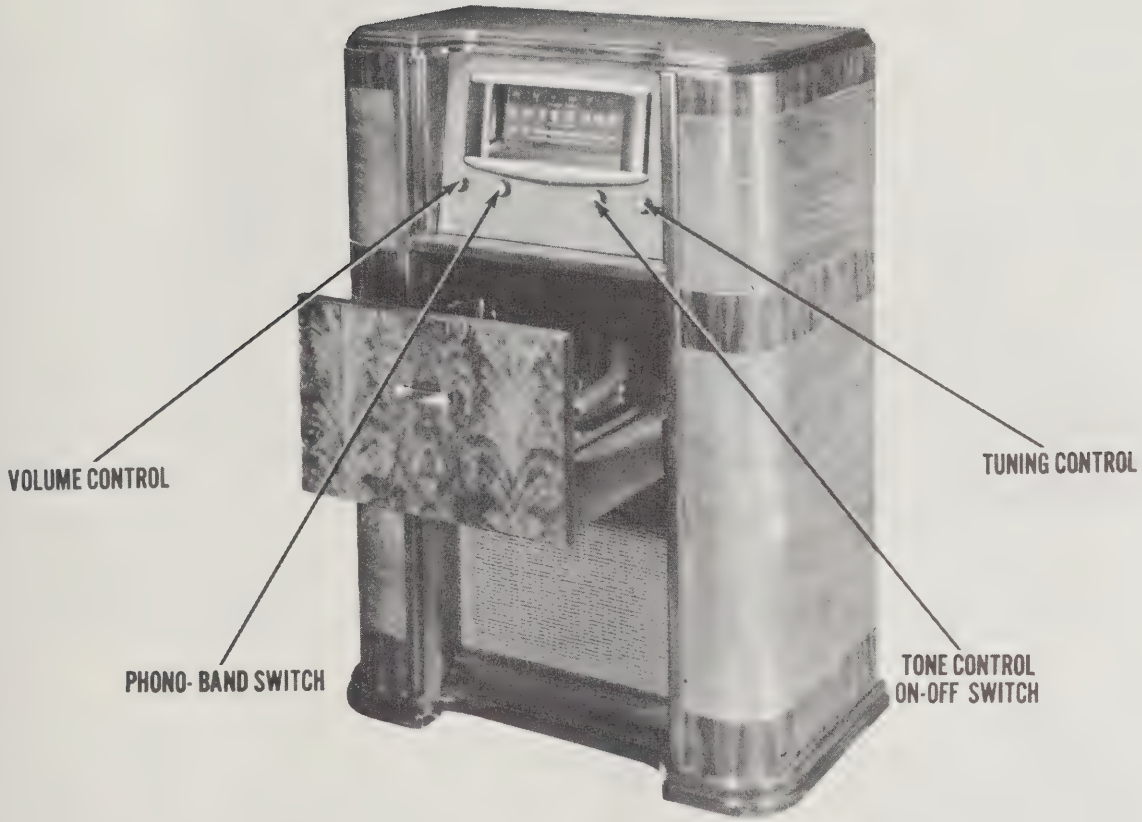
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

CROSLEY MODEL 87CQ, REVISED
MODELS 86CR, 86CS



CROSLEY MODEL 87CQ, REVISED
MODELS 86CR, 86CS

CROSLEY MODEL 87CQ

TRADE NAME	Crosley, Model 87CQ, Revised Models 86CR, 86CS
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated Combination Phono-Radio FM-2 Band AM Superheterodyne Receiver
TUBES(EIGHT)	Types, 6AC7 AM-FM Mixer, 7F8 FM Osc.-1st & 2nd AM Osc., 6SG7 2nd AM Mixer-FM IF Amp., 6SG7 AM-FM IF Amp., 6H6 Discriminator, 6SQ7 Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .64 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC SHORT WAVE 9.45-11.9MC FREQ. MOD. 88.1-107.9MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
1	AM-FM Mixer	6AC7	6AC7	8N	
2	FM Osc.-1st & 2nd AM Osc.	7F8	7F8	8BW	
3	2nd AM Mixer-FM IF Amp.	6SG7	6SG7	8BK	
4	AM-FM IF Amp.	6SG7	6SG7	8BK	
5	Discriminator	6H6	6H6	7Q	
6	Det.-AVC-AF	6SQ7	6SQ7	8Q	
7	Power Output	6V6GT	6V6GT	7AC	
8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

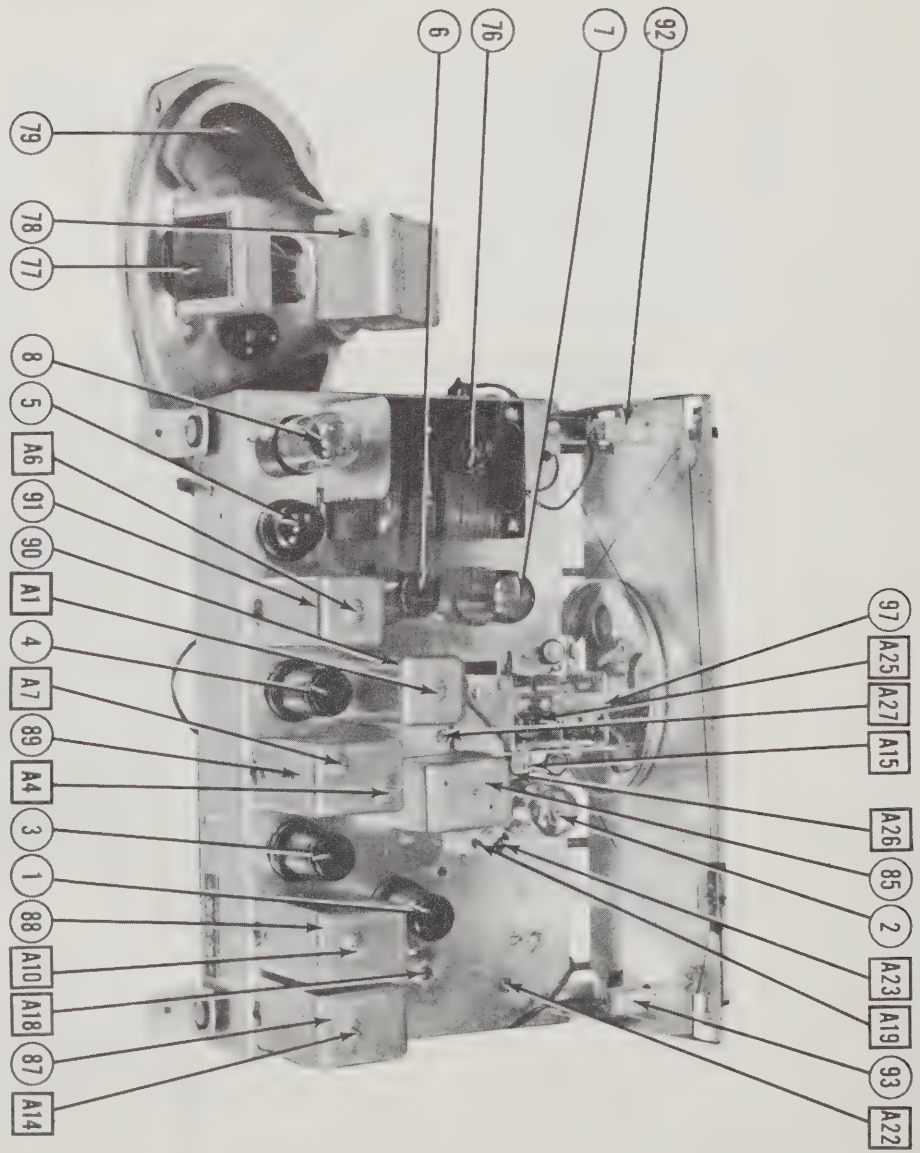
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
9A	20	400	B-137028	TL-421	AF444J4A	UP22245C	DY-403	Filter-Red
B	30	350						" -Blue
C	20	300						" -White
D	20	25		UT-203				Cathode Bypass-Br.
10	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	Output Plate Bypass
11	.05	200	39001-17	TC-15	484-05	DT2S5	S-4-05	Cathode Bypass
12	.01	600	39001-13	TC-11	684-01	DT6S1	S-6-01	Audio Coupling
13	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	Tone Comp.
14	.003	600	39001-76	TC-23	684-003	DT6D3	S-6-003	" "
15	.033	400		TC-15	484-05	DT4S5	S-4-05	Audio Coupling
16	.001	600	39001-7	TC-21	684-001	DT6D1	S-6-001	" "
17	.033	400		TC-15	484-05	DT4S5	S-4-05	" "
18	.05	200	39001-17	TC-15	484-05	DT2S5	S-4-05	AVC Filter
19	.025	600	39001-81	TC-13	684-03	DT6S25	S-6-03	2nd IF Plate Decoup.
20	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	2nd IF Screen Bypass
21	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	1st IF Plate Decoup.
22	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	1st IF Screen Bypass
23	.01	600	39001-13	TC-11	684-01	DT6S1	S-6-01	RF Bypass Pwr. Supply
24	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	AVC Filter
25	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	" "
26	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	Mixer Plate Decoup.
27	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	Mixer Screen Bypass
28	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	Filament Bypass
29	.005	600	39001-11	TC-25	684-005	DT6D5	S-6-005	" "
30	.001	600	39001-7	TC-21	684-001	DT6D1	S-6-001	De-emphasis
31	50	500	GC210685-183	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Bypass
32	100	500	GC210685-182	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter
33	1000	300	C-137727-8	1FM-21	1468-001	1W5D1	MO.3-21	AVC Filter-Cer.
34	27	500	B226638-35					Fixed Trimmer-Cer.
35	4.7	500	W-137398-6					Osc. Coupling-Cer.
36	91	300	B226638-52					Osc. Feedback-Cer.
37	39	300	B226638-51					Osc. Feedback-Cer.
38	15	500	B226638-59					Osc. Coupling-Cer.
39	53	500	W-138531					Fixed Trimmer-Cer.
40	10	500	B226638-49					Osc. Coupling-Cer.
41	10	500	B226638-49					Fixed Trimmer-Cer.
42	82	500	B226638-27					RF Coupling - Cer.
43	120	300	B226638-39					" " "
98	30	500		MS-43		5R5Q3	MOS.5-43	Fixed Trimmer

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	
44	3 Meg.	½	B135783			Volume Control tapped @ 750KΩ
45A	2.5 Meg	½	B142736			Tone Control & Sw.-Late Production
B	250KΩ-250KΩ†	½	B135784			Tone Control & Sw.-Early Production

†This control may measure from 3 Meg. to infinity across outside terminals being supposedly open at center. However, it is 250KΩ each side of center.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	
46	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Antenna Loading
47	1000Ω	½		BTS-1000	Br.-Blk.-Red Antenna Coil Shunt
48	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Variable Oscillator Grid
49	22KΩ	1	39373-170	BTA-22K	Red-Red-Or. Variable Oscillator Plate Load
50	56KΩ	½	39373-69	BTS-56K	Grn.-Blue-Or. Crystal Oscillator Grid
51	1.5 Meg.	½	39373-94	BTS-1.5 Meg.	Br.-Grn.-Grn. Crystal Oscillator Plate Load
52	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Mixer Grid
53	120KΩ	½	39373-75	BTS-120K	Br.-Red-Yl. Mixer Screen Dropping
54	2200Ω	½	39373-40	BTS-2200	Red-Red-Red Mixer Plate Decoupling
55	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
56	680KΩ	½	39373-90	BTS-680K	Blue-Gray-Yl. AVC Network
57	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. 1st IF Screen Dropping
58	2200Ω	½	39373-40	BTS-2200	Red-Red-Red 1st IF Plate Decoupling
59	68KΩ	½	39373-71	BTS-68K	Blue-Gray-Or. AVC Network
60	120KΩ	½	39373-75	BTS-120K	Br.-Red-Yl. Voltage Dropping
61	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Volume Control Shunt
62	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Tone Compensation
63	680KΩ	½	39373-90	BTS-680KΩ	Blue-Gray-Yl. AVC Network
64	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. Diode Load
65	27KΩ	½	39373-62	BTS-27K	Red-Vi.-Or. 2nd IF Screen Dropping
66	2200Ω	½	39373-40	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
67	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
68	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. " " "
69	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. De-emphasis
70	10 Meg.	½	39373-107	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
71	330KΩ	½		BTS-330K	Or.-Or.-Yl. AF Plate Load-See Note
72	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
73	220Ω	1	39373-129	BW-1-220	Red-Red-Br. Output Cathode
74A	400Ω	10		AB-400	Filter
B	700Ω			AB-750	"
75	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Tone Compensation

Note-Some models use 470KΩ in this application. Replacement same as #72.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	CROSLEY PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
76	117V AC @ .64A	660V CT @ .086A	5.3V AC @ 2.0A	6.6VAC @ 2.7A	B-135336	P-6012	T22R04	P-2952

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
77A	3900Ω	3.9Ω	260Ω	.3Ω	Part of C-138777	A-3825	T22S60	A-2902	Used in Model 87CQ
B	4000Ω	3.9Ω	270Ω	.45Ω	Part of C-135974	A-3856	T22S46	A-2903	Used in Models 86CR& 86CS.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	
78A	PM	3.9Ω	C-138777	ST-119* Mod. P10-T	10A31	Used in Model 87CQ
B	PM	3.9Ω	C-135974	ST-120* Mod. P10-S	10A31	Used in Models 86CR & 86CS
	CONE DIA.	VC DIA.				
79A	9½"	3/4"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			
B	9½"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

*Replace output transformer to match 6-8Ω voice coil.

DATE 3/48-#486-#5

SET #36-FOLDER #5

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CROSLEY PART No.	MEISSNER PART No.	
80	Loop Ant.		.2Ω	W-137143		
81	FM Ant.		INF.			
82	BC Ant.Coil		7.5Ω	AW-136511		
83	SW " "	.5Ω	.5Ω	AB-136444		
84	FM " "	0Ω	0Ω	AC-136171		
85A	BC Osc.Coil		.7Ω	AC-136509		
B	SW " "		.2Ω			
86	FM " "		0Ω	W-136179		
87	1st IF Trans	.5Ω	INF.	AC-136264		
88	2nd IF Trans	0Ω	.5Ω	AC-136081		
89A	AM 3rd IF	30Ω‡	32Ω‡	AC-136276		‡Includes AM & FM Primary & Secondary
B	FM 3rd IF					
90	4th AM IF	28Ω		AC-136261		
91	Disc.Trans.	.2Ω	.2Ω	AC-136260		

DIAL LIGHT

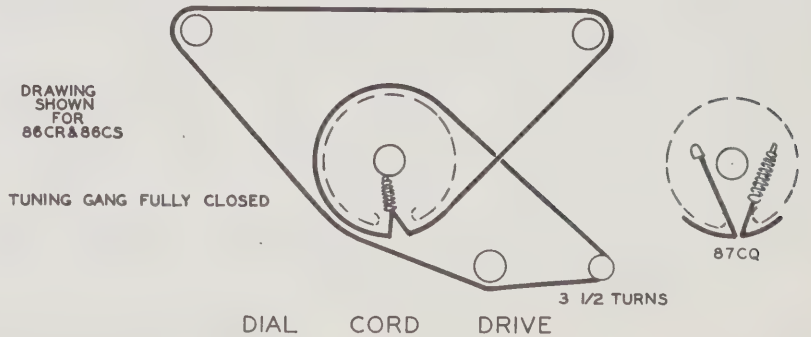
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					CROSLEY PART No.		
92	Bayonet	6-8	0.15	Brown	W-48858		Type 47
93	"	6-8	0.15	"	W-48858		" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	CROSLEY PART No.	ASTATIC PART No.	
94		L-75-A	L-75 Original Part.

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
95	Switch	C-136161	Band-Phono
96	Crystal	B-138774	Osc.
97	3 Gang Var. Cap.	C-135946	(16-410MMF, 12-57MMF, 12-57MMF)
A18	Trimmer	W-136964	FM Radiation Balance
A19	Padder	W-136964	SW Osc. Adj.
A22	Trimmer	C-137219-1	SW Ant. Adj. (Pri.)
A23	Padder	W-136964	BC Osc. Adj.
	Dial Glass	D-138674	Model 87CQ
	" "	D-136252	Models 86CR, 86CS
	Dial Pointer	W-136176-2	Model 87CQ
	" "	W-136176	Models 86CR, 86CS



CROSLEY MODEL 87CQ, REVISED
MODELS 86CR, 86CS PAGE 3

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to vertical index line below and to left of "Channel 200".

Use insulated alignment screwdriver for all adjustments.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

IF signal generator has 60∿ synchronizing voltage available it should be used for scope horizontal sweep voltage. If this is not available sync. voltage may be used from AC line. There maybe some phase shift between horizontal and vertical sweeps resulting in a double trace pattern such as Fig. 3. This may be corrected by inserting a capacitor of suitable value. (.01 to .1 MFD) in series with horizontal sync. voltage to scope. If either the scope or sig. gen. have a phase control then it should be adjusted to give a single trace pattern per Fig. 2.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 6SG7 2nd IF Amp. Tube (4) Low side to chassis.	167.5KC (freq. mod. 30KC sweep 60∿ mod.)	SW (1 position clock-wise)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A1,A2,	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
2	.1 MFD.	High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to chassis.	"	"	"	"	A3,A4.	"
3	30MMFD	"	10.7MC (Amp. mod. 30% 400∿)	FM (2 positions clock-wise)	"	Remove scope. Connect output meter across voice coil	A5	Adjust for minimum output.
4	30MMFD	"	10.7MC (Freq. Mod. 60 modulation 450KC sweep)	"	"	Vertical input in series with 100K ohm resistor to Point (B). Ground to chassis.	A6	Adjust for maximum amplitude and straightness of diagonal line with center of diagonal line at horizontal sweep line and peaks occurring approx. 80KC either side of center.
5	30MMFD.	"	"	"	"	"	A7,A8.	Adjust for maximum amplitude and straightness of diagonal line with center of diagonal line at horizontal sweep line and peaks occurring approximately 80KC either side of center. Attenuate signal to prevent overloading.
6	30MMFD.	High side to Pin 4 (grid) 6AC7. Low side to chassis.	"	"	"	"	A9, A10	Adjust for maximum amplitude and straightness of diagonal line with center of diagonal line at horizontal sweep line and peaks occurring approximately 80KC either side of center. Attenuate signal to prevent overloading.(Cont. with Step 8).

FIG. 1

FIG. 2

FIG. 3

IF ALIGNMENT USING AM SIGNAL GENERATOR AND OUTPUT METER

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 6SG7 2nd IF Tube (4). Low side to chassis.	167.5KC	SW (1 position clock-wise)	Tuning cap. fully open.	Across voice coil	A1	Shunt a 5000Ω carbon resistor in series with .1 MFD cap. from high side AM Output IF Transformer (90) pri. to chassis. Adjust A1 for maximum output.
2	.1 MFD.	"	"	"	"	"	A2	Remove shunt from step one and place it from Pin 4 6SQ7 to chassis near socket of same tube. Adjust A2 for maximum output. Remove shunt.
3	.1 MFD.	High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to chassis.	"	"	"	"	A3	Place shunt of Step 2 from Pin 8 (plate) of 6SG7 1st IF Tube (3).to junction of IF Transformer (89) and resistor (58). Adjust A3 for maximum output.
4	.1 MFD.	"	"	"	"	"	A4	Remove shunt from Step 3. Place it from Pin 4 (grid) 6SG7 2nd IF Tube 4 to junction of IF Transformer (89) & resistor (59). Adjust A4 for maximum output. Remove shunt.
5	30MMFD	High side to Pin 4 (grid) 6SG7. 2nd IF Tube (4). Low side to chassis.	10.7MC (400∿ AM)	FM 2 (positions clock-wise)	"	"	A5	Adjust for minimum output. Tune sig. gen. for maximum output on either side of minimum (approx. 75-100KC above and below 10.7MC) and note readings. The two readings should be the same either side of minimum. If not adjust A6 until they are.
6	30MMFD	High side to Pin 4 (grid) 6SG7. 1st IF Tube (3). Low side to chassis.	Tune for maximum output on high side of 10.7MC	"	"	"	A7,A8	Adjust for maximum output. Tune sig. gen. for maximum on low side of 10.7MC meter reading should be the same as for maximum Point above 10.7MC. If not readjust A7 & A8 slightly to make maximums equal either side of minimum.
7	30MMFD	High side to either side of FM ant. trimmer A17. Low side to chassis near same trimmer. (Dress leads away from under side of chassis.)	Tune for maximum output on high side of 10.7MC	"	"	"	A9,A10	Adjust for maximum output and note meter reading. Tune sig. gen. to maximum output on low side of 10.7MC and note meter reading. These two readings should be equal and should occur approximately 80KC either side of 10.7 MC. It may be necessary to readjust A9 & A10 slightly to make the two readings equal. Continue with Step 8.

5625KC IF AND RF ALIGNMENT

In Steps 14 & 19 field strength meter may consist of DC 100 micro ampere (full scale) meter shunted by .001 MFD cap. connect one side of crystal rectifier to one side of meter. Connect the other side of meter and crystal detector to a 5 ft. 75Ω twisted pair of leads. The capacitor and crystal leads to meter should be as short as possible.

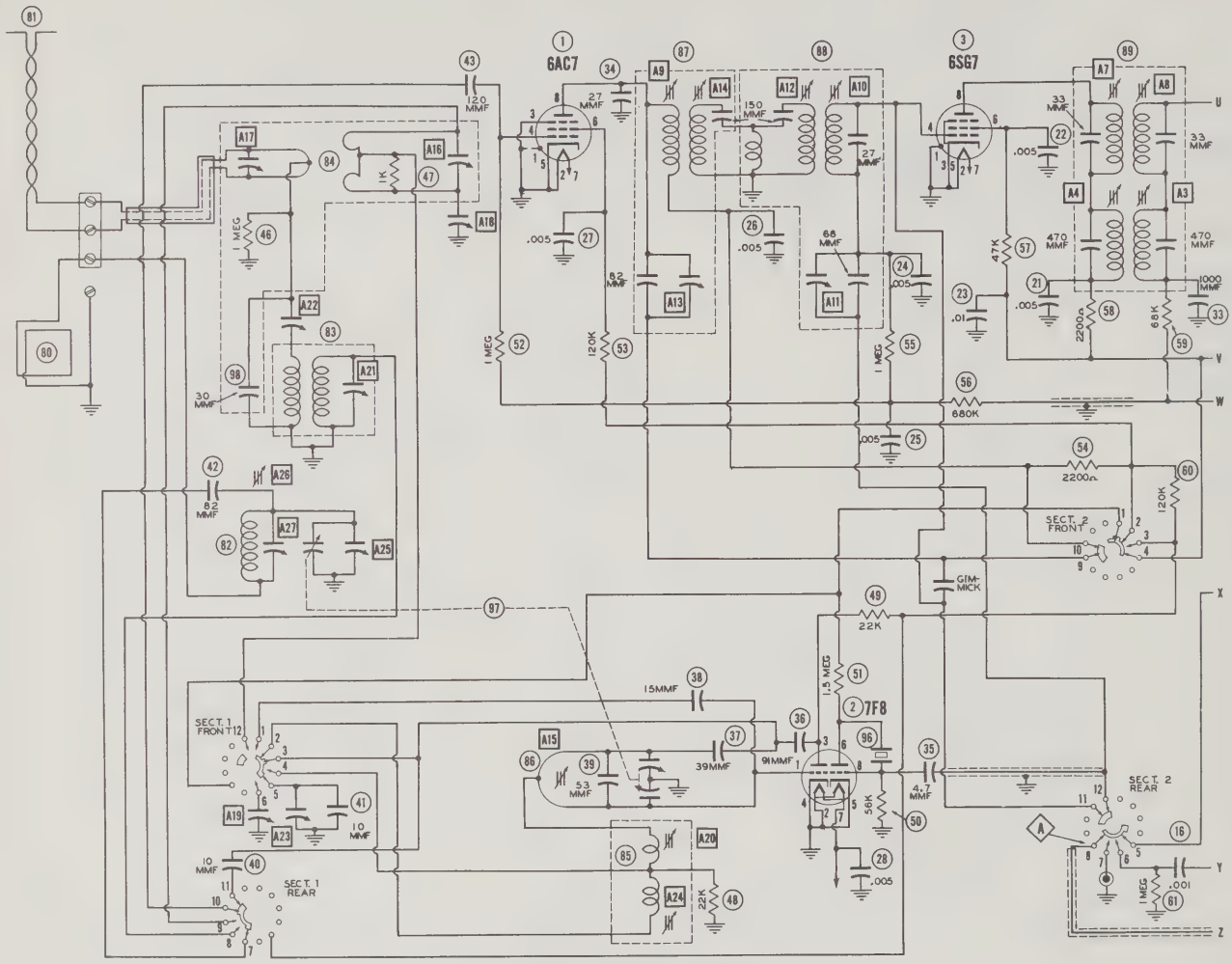
In Step 14 an alternate method of correct adjustment of A18 is: Connect VTVM to Pin 1 of 7F8 and adjust A18 for maximum deflection.

In Step 19 an alternate method of adjustment of A22 is as follows: with receiver installed in cabinet turn bandswitch to FM and tune in an FM station. If a 10.7MC signal (indicated by a whistle or code) is heard adjust A22 until interfering signal disappears or is minimized. This adjustment must be made slowly.

In step 20 special dummy ant. consists of 14.7 microhenry choke in parallel with 70MMFD cap. connected from loop antenna terminal to chassis. If this dummy is not available place chassis near cabinet and connect built-in loop antenna.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
8	30MMFD.	High side to short lead between IF Transformers (87 & 88) at rear of chassis. Low side to chassis.	Approx. 5825KC (Tune for maximum output)	SW	Tuning cap. fully open.	Across voice coil	A11, A12	Adjust for maximum output. Do not change setting of signal generator for next step.
9	30MMFD.	High side to Pin 4 (grid) 6AC7. Low side to chassis.	Do not change	"	"	"	A13, A14	Adjust for maximum output.
10	2-39Ω carbon res.	Each side in series with 39Ω to FM Dipole terminals.	100MC	FM	Channel 260.5	"	A15	Adjust A15 for midpoint of travel. Preset A18 to 2 turns from fully closed position.
11	"	"	"	"	"	"	A16	Short trimmer A7 with a 2" piece of tinned #14 wire. Adjust A16 for maximum output.
12	"	"	"	"	"	"	A17	Transfer shunt from preceeding step to trimmer A16. Adjust A17 for maximum output. Remove shorting shunt.
13	"	"	97.9MC	"	Channel 250		A15	Adjust for maximum output. Check receiver to see if it will tune through 87.9 & 107.9MC (Channel 200-300).
14	Field strength meter (See prealignment notes)	Disconnect sig. gen. Connect field strength meter to FM dipole terminals.			Channel 215		A18	Adjust for null point on field strength meter. If it is necessary to move A18 more than a quarter turn Steps 10, 11, 12 & 13 must be repeated. See prealignment notes for alternate methode of adjusting A18.
15	30MMFD	Remove field strength meter. High side of sig. gen. in series with 30MMFD cap. to one FM ant. term. Low side to chassis.	9.6MC	SW	9.6MC	Across voice coil	A19	Adjust for maximum output
16	30MMFD	"	11.8MC	"	11.8MC	"	A20	Adjust for maximum output Repeat Steps 15 & 16 until no further improvement can be made.
17	30MMFD.	"	10.7MC	"	Tune for maximum output.	"	A21	Short A22 from its junction with SW Ant. Coil (83) to chassis. Adjust A21 for maximum output. While rocking tuning capacitor.
18	30MMFD.	"	"	"	"	"	A22	Transfer short from preceeding Step to A21. Rock tuning cap. and adjust A22 for maximum output. Remove short.
19	30MMFD.	"	"	"	"	"	A22	Connect field strength meter across output terminals of sig. gen. Attenuate output of sig. gen. to obtain a reading of 10 to 15 micro amperes on field strength meter. Adjust A22 for lowest reading on meter. Make this adjustment slowly otherwise dip may be passed unnoticed. (See prealignment notes for alternate procedure of adjustment of A22.)
20	30MMFD.	Connect dummy ant. (See pre-alignment instruction). High side to loop ant. terminal. Low side to chassis.	535KC	AM (fully counter-clockwise)	Tuning cap. fully closed	"	A23	Preset A27 to two turns from fully closed position. Adjust A23 for maximum output.
21	30MMFD.	"	1620KC	"	Tuning cap. fully open.	"	A24	Adjust for maximum output. Repeat Steps 20 & 21 until no further improvement can be made.
22	30MMFD.	"	1400KC	"	Tune for maximum output.	"	A25	Adjust for maximum output.
23	30MMFD.	"	600KC	"	"	"	A26	Rock tuning cap. and adjust for maximum output.
24	30MMFD.	"	1400KC	"	"			
25	30MMFD.	"	Approx. 5825KC (Tune for max. output.)	"	Leave unchanged from preceeding Step.	Across voice coil	A27	Attenuate output of sig. gen. for midscale deflection of output meter. Adjust A27 for minimum output. Apply speaker cement to all adjustments.

WITH RECEIVER IN CABINET READJUST A26 FOR MAXIMUM VOLUME ON WEAK STATION AT 600KC.



‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	1	6AC7	0V.	0V.	0V.	-.6VDC	0V.	92VDC	6.6VAC	235VDC
	2A	7F8	-5VDC§	0V.	55VDC	0V.	0V.	16.5VDC	6.6VAC	-4VDC§
‡	2B	7F8	-1.2VDC§	0V.	125VDC	0V.	0V.	0V.	6.6VAC	0V.
	3	6SG7	0V.	0V.	0V.	-.7VDC	0V.	120VDC	6.6VAC	230VDC
	4	6SG7	0V.	0V.	0V.	-.6VDC	0V.	125VDC	6.6VAC	220VDC
‡	5	6H6	0V.	0V.	-.3VDC	0V.	-.3VDC	0V.	6.6VAC	0V.
	6	6SQ7	0V.	-.4VDC	0V.	-.4VDC	0V.	95VDC	6.6VAC	0V.
	7	6V6GT	0V.	0V.	260VDC	250VDC	0V.	0V.	6.6VAC	10VDC
	8	5Y3GT	0V.	300VDC	0V.	330VAC	0V.	330VAC	0V.	300VDC

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	1	6AC7	0Ω	0Ω	0Ω	3 Meg.	0Ω	250KΩ	.1Ω	127KΩ
	2A	7F8	22KΩ	0Ω	267KΩ	0Ω	0Ω	1.6 Meg.	.1Ω	56KΩ
‡	2B	7F8	22KΩ	0Ω	175KΩ	0Ω	0Ω	INF.	.1Ω	56KΩ
	3	6SG7	0Ω	0Ω	0Ω	3 Meg.	0Ω	173KΩ	.1Ω	127KΩ
	4	6SG7	0Ω	0Ω	0Ω	900KΩ	0Ω	152KΩ	.1Ω	127KΩ
‡	5	6H6	0Ω	0Ω	100KΩ	200KΩ	100KΩ	300KΩ	.1Ω	0Ω
	6	6SQ7	0Ω	10 Meg.	0Ω	300KΩ	0Ω	595KΩ	.1Ω	0Ω
	7	6V6GT	0Ω	0Ω	125KΩ	125KΩ	470KΩ	INF.	.1Ω	210Ω
	8	5Y3GT	INF.	125KΩ	INF.	70Ω	INF.	75Ω	INF.	125KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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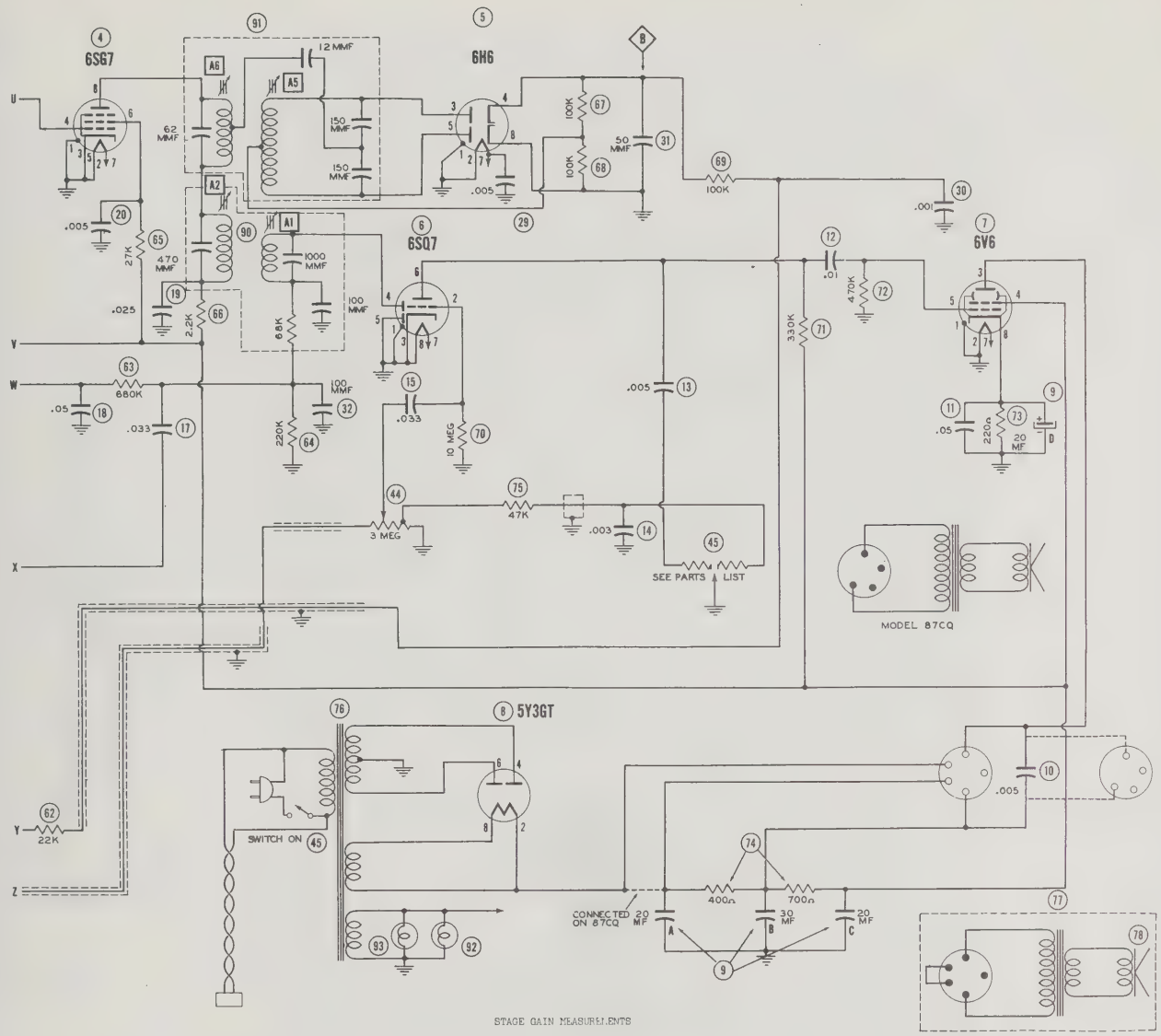
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



IF=167.5KC AM
IF=5825KC AM
IF=10.7MC FM

STAGE GAIN MEASUREMENTS

3rd IF TRANS.	1.4X	167.5KC
2nd IF TUBE	60X	167.5KC
4th IF Trans.	4X	167.5KC
AUDIO	50X	400 ∿
OUTPUT	20X	400 ∿

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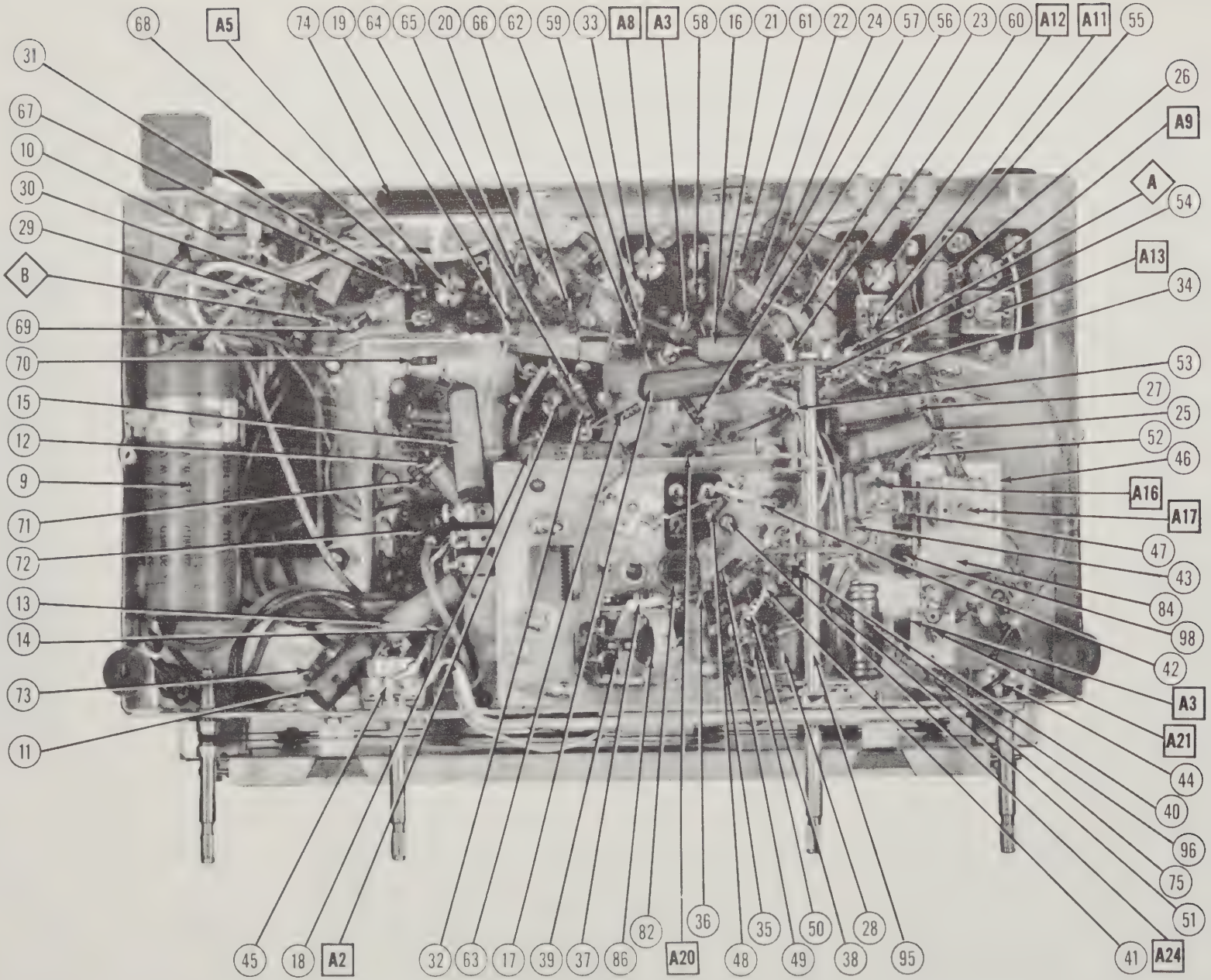
486-5

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.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FADA
MODEL 795

FADA
MODEL 795

FADA MODEL 795			
TRADE NAME	Fada, Model 795		
MANUFACTURER	Fada Radio & Elect. Co. Inc., Long Island City, N.Y.		
TYPE SET	AC Operated FM Tuner with Power Supply		
TUBES (FIVE)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 Ratio Detector.		
POWER SUPPLY	105-125 Volts AC		
FREQ. MOD.	88-108MC	RATING	.28 Amp. @ 117 Volts AC

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DATE 3/48-#486-6 SET #36-FOLDER #6

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		FADA PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6LE8	7CH	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6BA6	6BA6	7BK	
5	Ratio Det.	6AL5	6AL5	6BT	

CAPACITORS

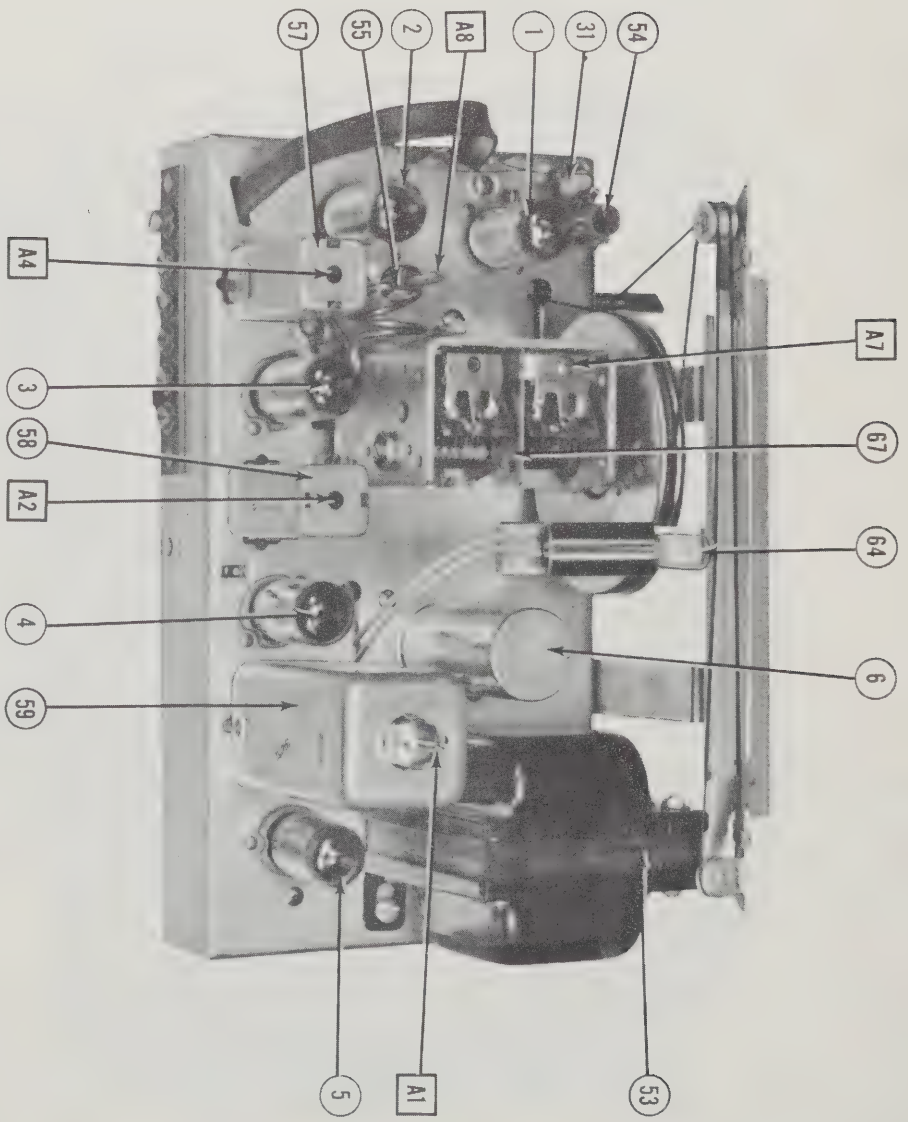
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	FADA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	40	150	22.1	EL-340	AF888D	UP43-15	DY-403020-150	▲ Filter
B	30	150						■ "
C	20	150						"
7	4	50	22.30	UT-41	PRS150-4	BR415	M-4-450	Stabilizing Cap.
8	.01	600	12.22	TC-11	684-01	DT2S1	MPH-6-01	Line Filter
9	.01	200	12.43	TC-11	484-01	DT2S1	S-4-01	Filament Bypass
10	.02	400	12.31	TC-12	484-02	DT4S2	S-4-02	AVC Filter
11	.02	400	12.8	TC-12	484-02	DT4S2	S-4-02	Audio Coupling
12	50	500	17.49	1FM-45	1468-00005	5W5Q5	MO.5-45	Line Ant. Coupling-Cer.
13	1500	300	17.45	1FM-215	1467-0015	1W5D15	MW.5-215	RF Bypass-Cer.
14	270	500	17.9	1FM-33	1468-0003	5W5T3	MO.5-33	Diode Load Cap.
15	1500	300	17.45	1FM-215	1467-0015	1W5D15	MW.5-215	De-emphasis-Cer.
16	5000	300	17.44	1FM-25	1467-005	1D5D5	MW.5-25	2nd IF Plate Decoup.-Cer.
17	5000	300	17.44	1FM-25	1467-005	1D5D5	MW.5-25	2nd IF Screen Bypass-Cer.
18	5000	300	17.44	1FM-25	1467-005	1D5D5	MW.5-25	2nd IF Cathode Bypass-Cer.
19	5000	300	17.44	1FM-25	1467-005	1D5D5	MW.5-25	1st IF Plate Decoup.-Cer.
20	5000	300	17.44	1FM-25	1467-005	1D5D5	MW.5-25	1st IF Screen Bypass-Cer.
21	100	500	17.47	1FM-31	1468-0001	5W5T1	MO.5-31	AVC Filter-Cer.
22	5000	500	17.44	1FM-25	1467-005	1D5D1	MW.5-25	Conv. Plate Decoup.-Cer.
23	5000	500	17.44	1FM-25	1467-005	1D5D1	MW.5-25	Conv. Screen Bypass-Cer.
24	8.2	500	17.54					Osc. Feedback-Cer.
25	50	500	17.49	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.-Cer.
26	82	500	17.53					Fixed Pad
27	50	500	17.49	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling-Cer.
28	1500	300	17.45	1FM-215	1467-0015	1W5D15	MW.5-215	RF Plate Decoupling-Cer.
29	1500	300	17.45	1FM-215	1467-0015	1W5D15	MW.5-215	RF Screen Bypass-Cer.
30	1500	300	17.45	1FM-215	1467-0015	1W5D15	MW.5-215	RF Cathode Bypass-Cer.
31	100	500	17.47	1FM-31	1468-0001	5W5T1	MO.5-31	AVC Filter-Cer.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	FADA PART No.	IRC PART No.	
32	22KΩ	½	32.13	BTS-22K	Red-Red-Or. AVC Network
33	68Ω	½	32.1		Blue-Gray-Blk. RF Cathode
34	1000Ω	½	32.8	BTS-1000	Br.-Blk.-Red RF Screen Dropping
35	470Ω	½	32.30	BTS-470	Yl.-Vi.-Br. RF Plate Decoupling
36	22KΩ	½	32.13	BTS-22K	Red-Red-Or. Oscillator Grid
37	1000Ω	½	32.8	BTS-1000	Br.-Blk.-Red Converter Screen Dropping
38	470Ω	½	32.30	BTS-470	Yl.-Vi.-Br. Converter Plate Decoupling
39	22KΩ	½	32.13	BTS-22K	Red-Red-Or. AVC Network
40	1000Ω	½	32.8	BTS-1000	Br.-Blk.-Red 1st IF Screen Dropping
41	470Ω	½	32.30	BTS-470	Yl.-Vi.-Br. 1st IF Plate Decoupling
42	68Ω	½	32.1		Blue-Gray-Blk. 2nd IF Cathode

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	FADA PART No.	IRC PART No.	
43	100Ω	2	32.7	BTS-100	Br.-Blk.-Red 2nd IF Screen Dropping
44	470Ω	2	32.30	BTS-470	Yl.-Vi.-Br. 2nd IF Plate Decoupling
45	1.5MΩ	2	32.6		Br.-Gr.-Br. Balancing Network
46	1.5MΩ	2	32.12	BTS-15K	Br.-Grn.-Or. De-emphasis
47	4.7MΩ	2	32.85	BTS-47K	Red-Vi.-Or. Ratio Detector Diode Load
48	2.2 Meg.	2	32.24	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
49	220KΩ	2	32.18	BTS-220K	Red-Red-Yl. " "
50	470Ω	1	32.113	BTA-470	Yl.-Vi.-Br. Filter
51	22Ω	2	32.109	BW-½-22	Red-Yl.-Blk. Surge Limiter
52	10Ω	2			Br.-Blk.-Blk. Parasitic Suppressor-See Note

Note-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	FADA PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
53	117V AC @ .28A	117V AC @ .06A	6.4V AC @ 2.0A		4220			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	FADA PART No.	MEISSNER PART No.
54	Ant. Coil	.1Ω	.1Ω	37.117	
55	RF Coil		0Ω	37.128	
56	Osc. Coil		0Ω	37.127	
57	1st IF	.6Ω	.6Ω	37.112	
58	2nd IF	.6Ω	.6Ω	37.132	
59	Ratio Det.	.8Ω	.1Ω	37.116	
60	Plate Choke		.1Ω	37.129	
61	Fil. Choke		.1Ω	37.120	
62	Line Choke		.1Ω	37.129	
63	Line Choke		.1Ω	37.129	

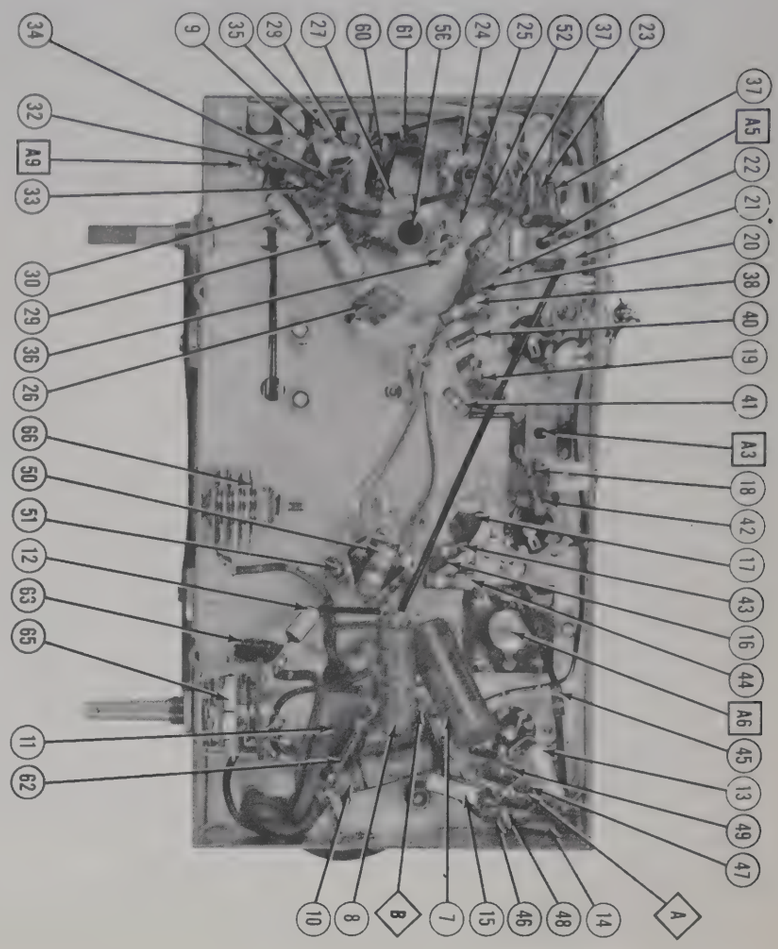
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					FADA PART No.		
64	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	FADA PART No.	NOTES
65	Switch	47.84	On-Off (SPST)
66	Rectifier	112.6	Selenium
67	2 Gang Var. Cap.	37.129	

CHASSIS—BOTTOM VIEW



ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set left edge of pointer saddle 1-1/16" from extreme left end of dial backplate.
Use insulated alignment screwdriver for all adjustments.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal 60∿ modulation with 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (freq. mod.)	Tuning cap. fully open.	Vertical input to Point Ⓐ. Ground to chassis.	A1,A2, A3	Disconnect 4 MFD cap. from Point Ⓐ. Adjust A1, A2 & A3 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
2	.01 MFD	High side to Pin 7 (grid) 6BL6. Low side to chassis.	"	"	"	A4,A5	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
3	.01 MFD	"	"	"	Vertical input to Point Ⓑ. Ground to chassis.	A6	Reconnect 4 MFD cap. to Point Ⓐ. Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with RF alignment Step 5.

FIG. 1

FIG. 2

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

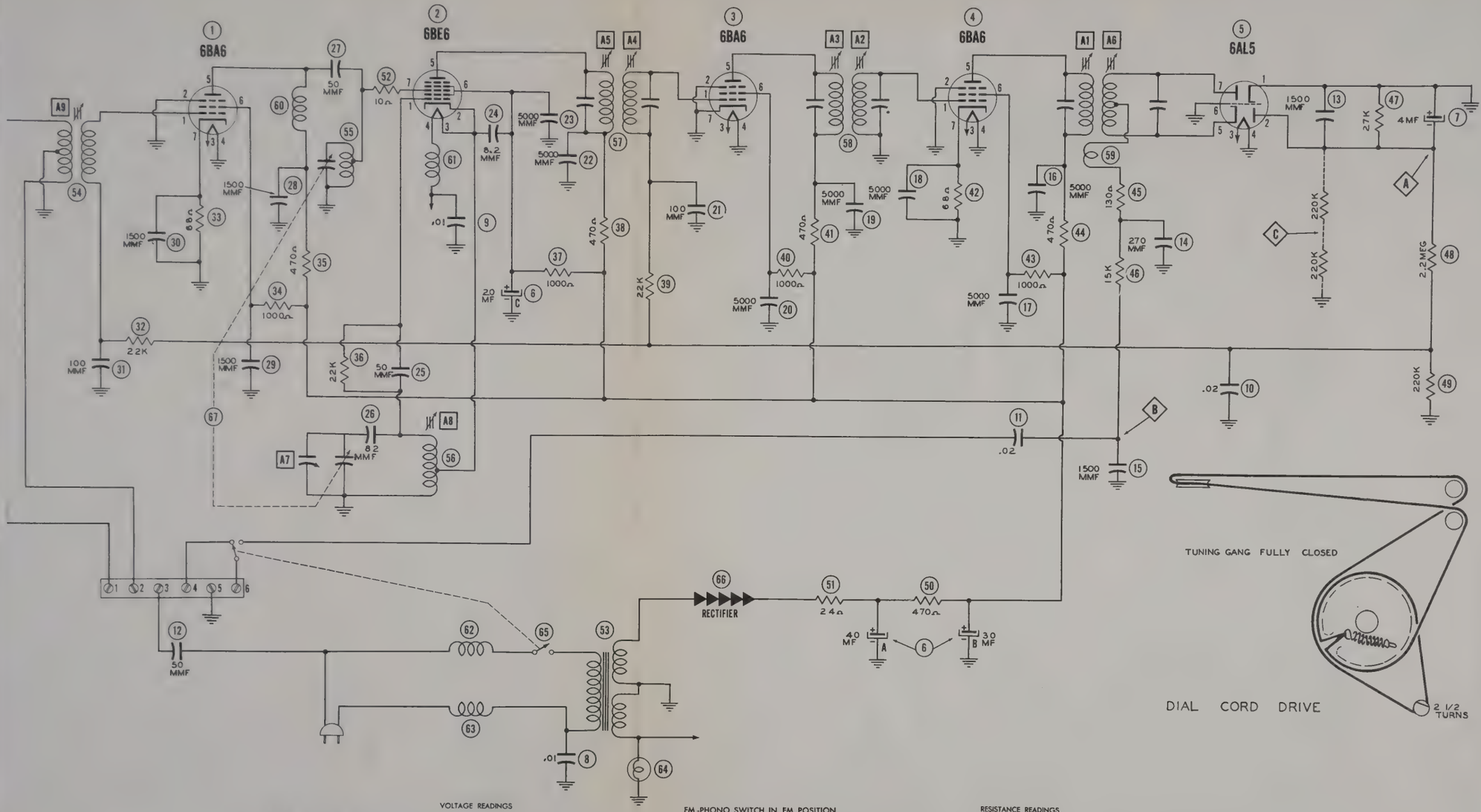
In Step 4 connect two 220KΩ resistors in series from Point Ⓐ to chassis. The junction of the two resistors is Point Ⓐ (see schematic). The values of these two resistors must be within 1% of each other.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD	High side to Pin 1 (grid) 6BA6 2nd IF Tube (4). Low side to chassis.	10.7MC (unmodulated)	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection.
2	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	A2,A3	Shunt primary of 2nd IF trans. with a 10 MMF. cap. and adjust A2 for maximum deflection. Transfer shunt cap. to secondary of 2nd IF Trans. and adjust A3 for max. deflection.
3	.01 MFD	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	A4,A5	Transfer shunt cap. to primary of 1st IF trans. and adjust A4 for maximum deflection. Transfer shunt cap. to secondary of 1st IF trans and adjust A5 for maximum deflection.
4	.01 MFD	High side to Pin 1 (grid) 6BA6 2nd IF Tube (4). Low side to chassis.	"	"	DC probe to Point Ⓐ. Common to Point Ⓐ. (See prealignment notes)	A6	Adjust for zero deflection.

RF ALIGNMENT

In Step 7 use a tuning wand to check alignment of RF coil. If upon insertion of brass end meter deflection increases spread turns of coil slightly. If insertion of powdered iron causes an increase compress turns slightly. Alignment is correct when insertion of either end causes a decrease. After adjustment of coil repeat Steps 5 & 6.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	2 150Ω carbon res.	Each side in series with 150Ω to terminals 1 & 2 on ant. terminal strip.	106MC (unmodulated)	Left edge of dial pointer saddle 5-1/32" from left end of dial backplate.	DC probe to Point Ⓐ. Common to chassis.	A7	Adjust for maximum deflection.
6	"	"	88MC	Left edge of pointer saddle 1-19/32" from left edge of dial backplate.	"	A8	Adjust for maximum deflection. Repeat Step 5 & 6 until no further improvement can be made.
7	"	"	106MC	Tune for maximum deflection	"	RF Coil (55)	Adjust RF coil per prealignment instructions.
8	"	"	98MC	"	"	A9	Adjust for maximum deflection.



IF=10.7MC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	-.4VDC	0V.	6.4VAC	0V.	92VDC	92VDC	.8VDC
2	6BE6	-3.6VDC§	0V.	0V.	6.4VAC	90VDC	91VDC	0V.
3	6BA6	-.6VDC	0V.	6.4VAC	0V.	92VDC	87VDC	0V.
4	6BA6	0V.	0V.	6.4VAC	0V.	92VDC	92VDC	1VDC
5	6AL5	0V.	-.7VDC	6.4VAC	0V.	-.6VDC	0V.	.1VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

FM-PHONO SWITCH IN FM POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	240KΩ	0Ω	.1Ω	0Ω	150KΩ	150KΩ	68Ω
2	6BE6	22KΩ	0Ω	0Ω	.2Ω	150KΩ	150KΩ	0Ω
3	6BA6	240KΩ	0Ω	.1Ω	0Ω	150KΩ	150KΩ	0Ω
4	6BA6	.6Ω	0Ω	.1Ω	0Ω	150KΩ	150KΩ	68Ω
5	6AL5	0Ω	.27KΩ	.1Ω	0Ω	INF.	0Ω	INF.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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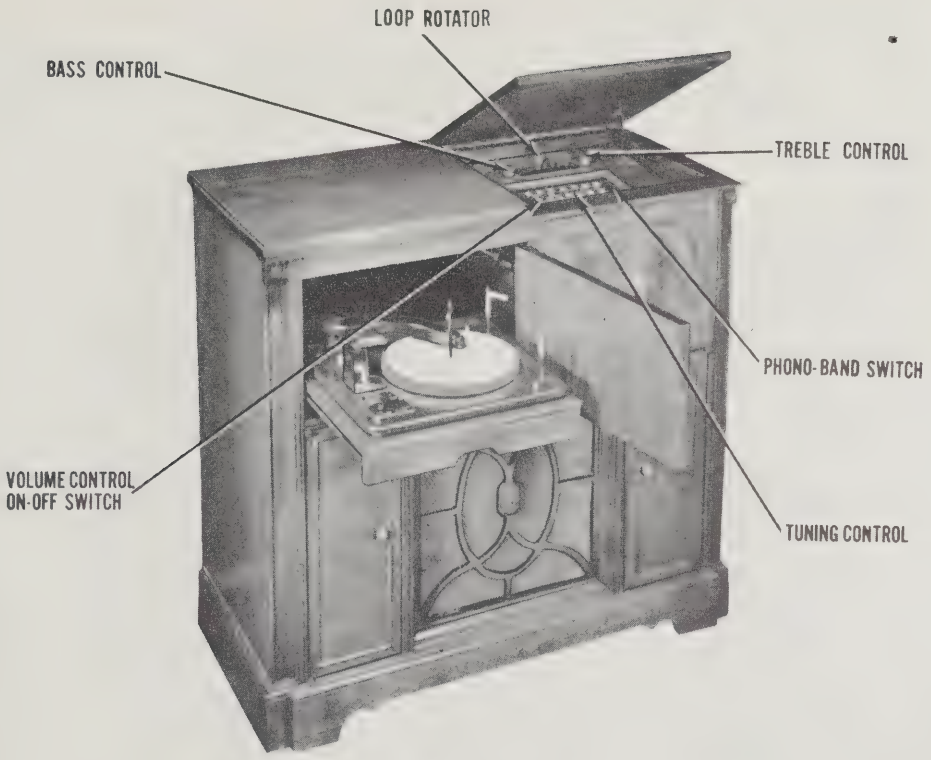
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

FIRESTONE (AIR CHIEF) MODEL 4-A-15 (Code #177-7-4A15)

FIRESTONE (AIR CHIEF) MODEL 4-A-15 (Code #177-7-4A15)



AIR CHIEF MODEL 4-A-15

TRADE NAME	Air Chief, Model 4-A-15 (Code 177-7-4A15)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	AC Operated Combination Phono-Radio 2 Band AM-FM Superheterodyne Receiver with Loop Antenna
TUBES(FIFTEEN)	Types, 6AG5 FM RF Amp., 6SK7 AM RF Amp., 6AG5 FM Mixer, 6C4 FM Osc., 6SA7 AM Converter, 6SK7 AM-FM IF Amp., 6SK7 2nd FM IF Amp., 6SK7 3rd FM IF Amp., 6H6 Ratio Det.-FM AVC, 6SQ7 AM-Det.-AVC-AF, 6SQ7 Phase Inv.-Gas Gate, 6SJ7 Phono Pre-Amp., (2) 6V6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC RATING 1.1 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC SHORT WAVE 9.4-15.4MC FREQ. MOD. 87.5-108.5MC

PUSHBUTTON ADJUSTMENTS

Range of pushbuttons reading from left to right are 550-1000KC, 550-1000KC, 650-1300KC, 650-1300KC, 850-1600KC, 850-1600KC.

Make a list of stations to be set up ranging from low to high freq. making certain that each station falls within range of its button.

1. Turn receiver on and allow it to warm up for at least 15 minutes.
2. Remove escutcheon plate covering adjusting screws, turn bandswitch to pushbutton position (2 positions clockwise).
3. Push in first button on left and adjust B1 to tune in desired station.
4. Adjust B2 for maximum volume.
5. To set up the remaining buttons follow the same procedure outlined above.
6. Check correct station setting by alternately switching from pushbutton tuning to manual tuning.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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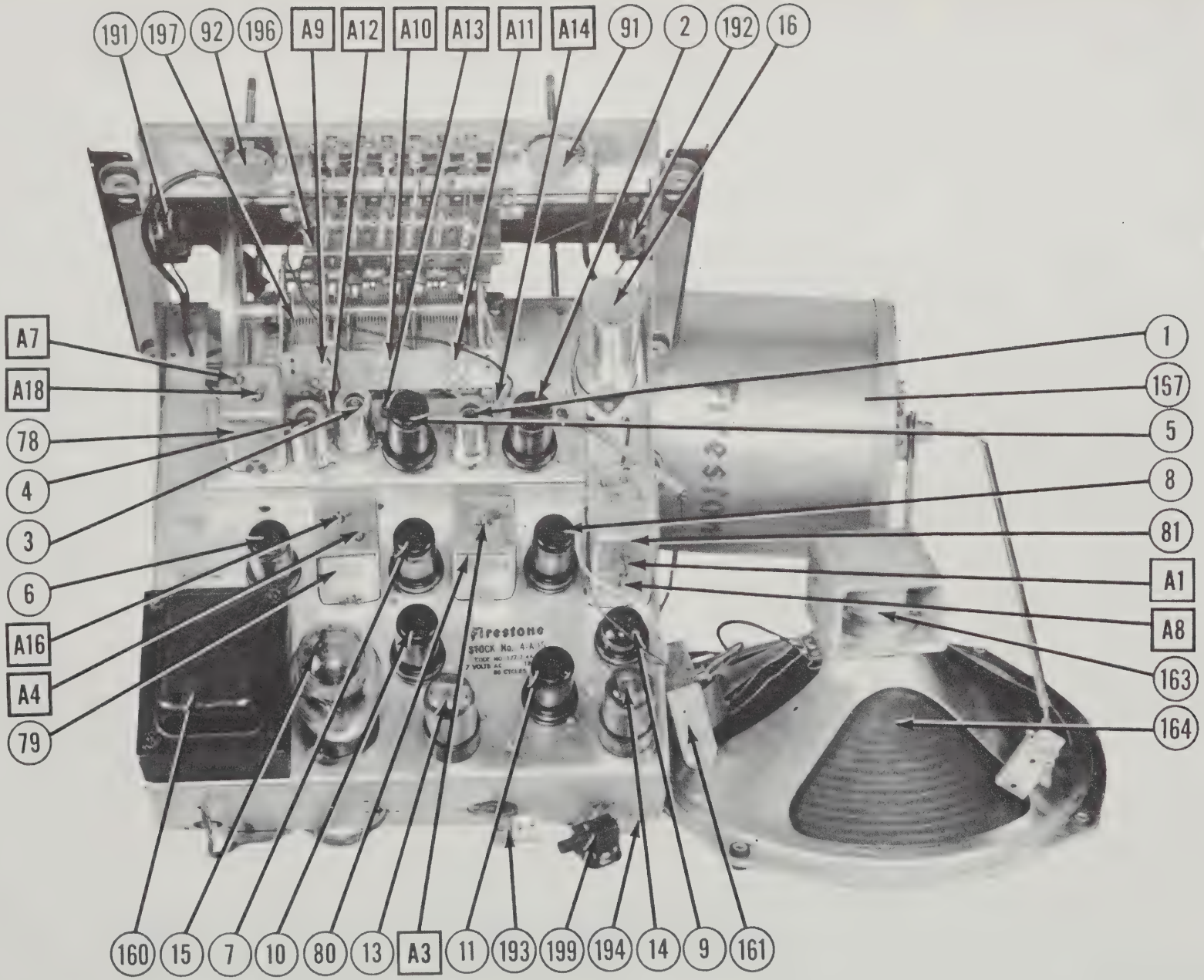
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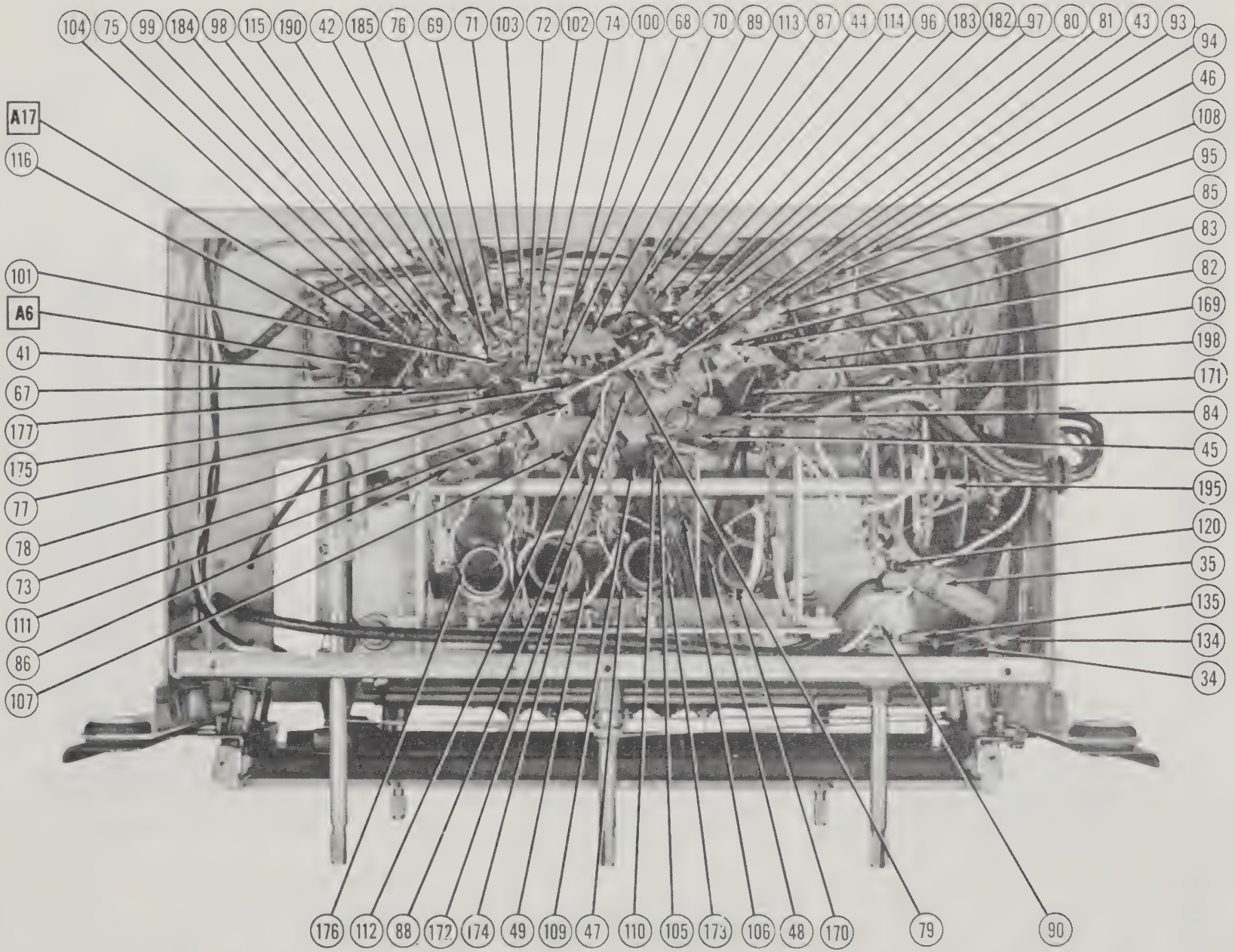
Firestone

FIRESTONE (AIR CHIEF) MODEL
4-A-15 (Code #177-7-4A15) PAGE 3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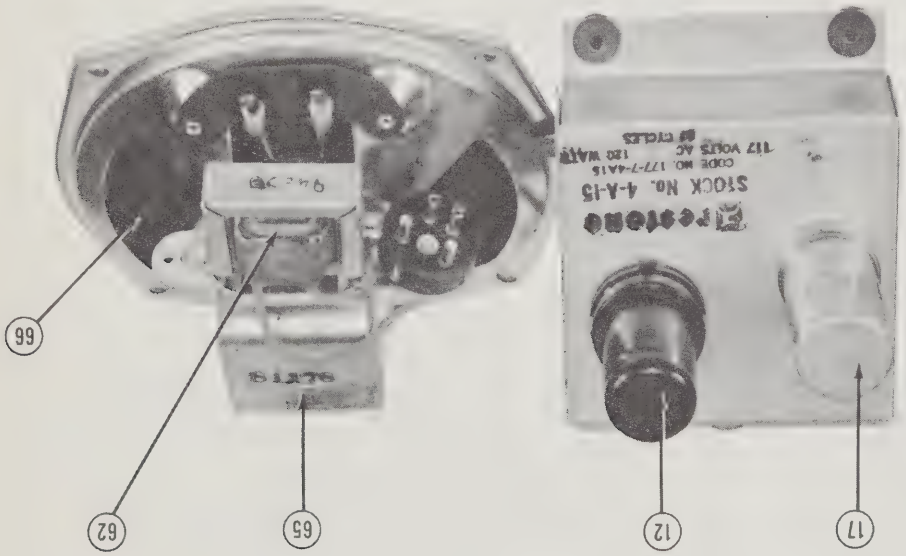

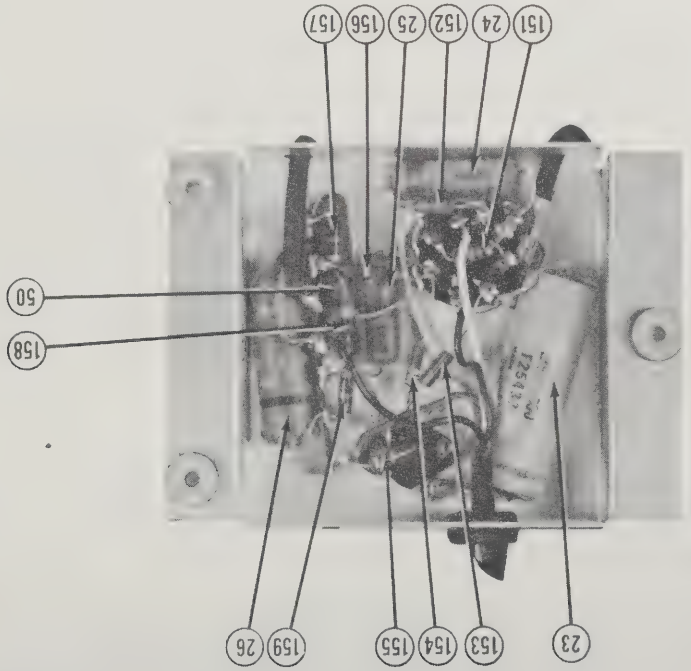

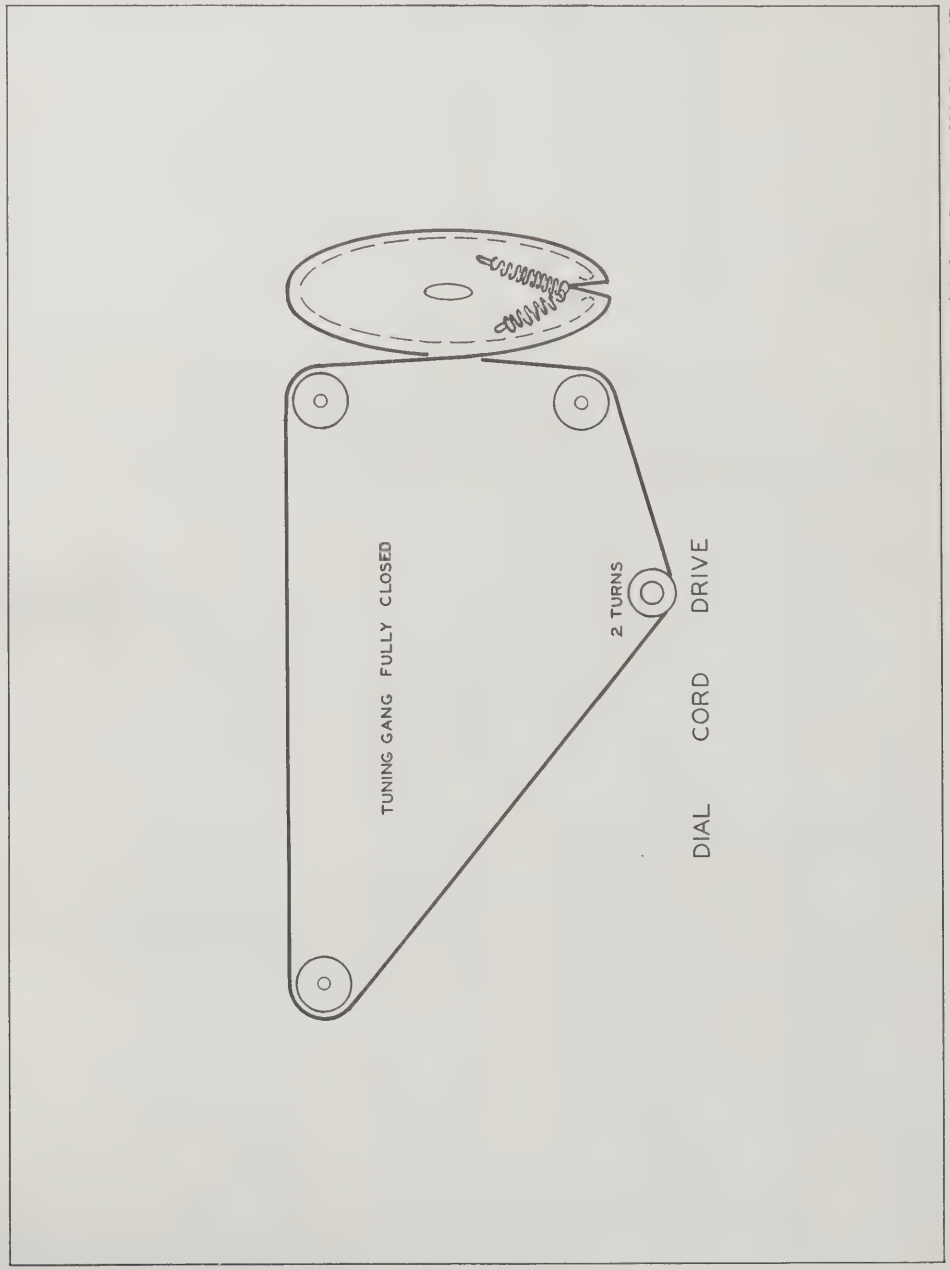

DATE 3/48-#486-7 SET #36-FOLDER #7

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6AG5	6AG5	7BD	
2	AM RF Amp.	6SK7	6SK7	8N	
3	FM Mixer	6AG5	6AG5	7BD	
4	FM Osc.	6C4	6C4	6BG	
5	AM Conv.	6SA7	6SA7	8R	
6	AM-FM IF Amp.	6SK7	6SK7	8N	
7	2nd FM IF Amp.	6SK7	6SK7	8N	
8	3rd FM IF Amp.	6SK7	6SK7	8N	
9	Ratio Det.-FM-AVC	6H6	6H6	7Q	
10	AM Det.-AVC-AF	6SQ7	6SQ7	8Q	
11	Phase Inv.-Gas Gate	6SQ7	6SQ7	8Q	
12	Phono Pre-Amp.	6SJ7	6SJ7	8N	
13	Power Output	6V6GT	6V6GT	7AC	
14	" "	6V6GT	6V6GT	7AC	
15	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
16A	40	450	25277	TEL-424*	AF862J4A*	UP222245	DY-406*	▰ Filter
B	30	450		UT-20	PRS450-10			■ "
C	20	450						▲ "
17A	20	450	25431	EL-350	AF44J	UP2245	DY-2x20-450	■ "
B	20	25						▲ Cathode Bypass
18	50	25	25269	TA-50	PRS25-50	BR502	M-50-25	" "
19	4	100	25270	UT-41	PRS150-4	BR415	M-4-450	Stabilizing Cap.
20	4	100	25270	UT-41	PRS150-4	BR415	M-4-450	" "
21	50	25	25269	TA-50	PRS25-50	BR502	M-50-25	Bias Filter
22	.005	600	25031	TC-25	684-005	DT6D5	MPH-6-005	Line Filter
23	.25	600	25433	TC-2	684-25	DT6P25	S-6-25	Pre-Amp. Screen Byp.
24	.005	200	25126	TC-25	484-005	DT6D5	S-6-005	Tone Comp.
25	.001	200	25432	TC-21	484-001	DT6D5	S-6-001	Audio Coupling
26	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	" "
27	.002	600	25185	TC-22	684-002	DT6D5	S-6-002	" "
28	.003	600	25184	TC-23	684-003	DT6D3	S-6-003	Output Plate Bypass
29	.003	600	25184	TC-23	684-003	DT6D3	S-6-003	" " "
30	.02	600	25195	TC-12	684-02	DT6S2	S-6-02	Audio Coupling
31	.02	600	25195	TC-12	684-02	DT6S2	S-6-02	" "
32	.01	600	25194	TC-11	684-01	DT6S1	S-6-01	" "
33	.002	600	25185	TC-22	684-002	DT6D2	S-6-002	" "
34	.005	600	25141	TC-25	684-005	DT6D5	S-6-005	Tone Comp.
35	.005	600	25141	TC-25	684-005	DT6D5	S-6-005	Audio Coupling
36	.002	600	25185	TC-22	684-002	DT6D5	S-6-002	De-emphasis
37	.1	600	25215	TC-1	684-1	DT6P1	S-6-1	RF Bypass Pwr. Supply
38	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	1st IF Screen Bypass
39	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	1st IF Decoupling
40	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	RF Bypass Pwr. Supply
41	.05	200	25196	TC-15	484-05	DT4S5	S-6-05	AVC Filter
42	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	AM Conv. Plate Decoup.
43	.1	600	25215	TC-1	684-1	DT6P1	S-6-1	RF Bypass Pwr. Supply
44	.005	600	25183	TC-25	684-005	DT6D5	S-6-005	Osc. Feedback
45	.01	600	25194	TC-11	684-01	DT6S1	S-6-01	AM RF Decoupling
46	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	AM RF Screen Bypass
47	.01	600	25194	TC-11	684-01	DT6S1	S-6-01	AVC Filter
48	.05	600	25196	TC-15	684-05	DT6S5	S-6-05	" "
49	.01	600	25194	TC-11	684-01	DT6S1	S-6-01	AM RF Decoup.
50	.003	600	25184	TC-23	684-003	DT6D3	S-6-003	Pre-Amp. Tone Comp.
51	.01	300	25112	TC-11	484-01	DT4S1	S-4-01	Phono Tone Comp.
52	.02	200	25276	TC-12	484-02	DT4S2	S-4-02	" " "
53	100		25188	1FM-31	1468-0001	5W5T1	MO.5-31	AF Plate Bypass
54	100		25188	1FM-31	1468-0001	5W5T1	MO.5-31	Tone Comp.
55	47		25193	1FM-45	1468-00005	5W5Q5	MO.5-45	IF Coupling
56	5000		25141	1FM-25	684-005	1D5D5	MW.5-25	AVC Filter
57	100		25188	1FM-31	1468-0001	5W5T1	MO.5-31	Diode Load Cap.
58	100		25188	1FM-31	1468-0001	5W5T1	MO.5-31	" " "

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
111	100Ω	±	77258	BW-½-100	Br.-Blk.-Br. Parasitic Suppressor
112	100Ω	±	77258	BW-½-100	Br.-Blk.-Br. Parasitic Suppressor
113	22KΩ	±	77266	BTS-22K	Red-Red-Or. AM Oscillator Grid
114	15KΩ	2	77325	BT-2-15K	Br.-Grn.-Or. AM Converter Screen Dropping
115	1000Ω	±	77262	BTS-1000	Br.-Blk.-Red AM Converter Decoupling
116	100KΩ	±	77214	BTS-100K	Br.-Blk.-Yl. AVC Network
117	68Ω	±	77269	BW-½-68	Blue-Gray-Blk. 1st IF Cathode
118	39KΩ	1	77322	BTA-39K	Or.-White-Or. 1st IF Screen Dropping
119	1000Ω	±	77262	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
120	100KΩ	±	77214	BTS-100K	Br.-Blk.-Yl. Tone Compensation
121	47KΩ	±	77213	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
122	470KΩ	±	77217	BTS-470K	Yl.-Vi.-Yl. Diode Load
123	100KΩ	±	77214	BTS-100K	Br.-Blk.-Yl. AVC Network
124	68Ω	±	77269	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
125	39KΩ	1	77322	BTA-39K	Or.-White-Or. 2nd IF Screen Dropping
126	1000Ω	±	77262	BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
127	220Ω	±	77209	BW-½-220	Red-Red-Br. 3rd IF Cathode
128	39KΩ	1	77322	BTA-39K	Or.-White-Or. 3rd IF Screen Dropping
129	1000Ω	±	77262	BTS-1000	Br.-Blk.-Red 3rd IF Decoupling
130	22KΩ	±	77266	BTS-22K	Red-Red-Or. De-emphasis
131	33KΩ	±	77267	BTS-33K	Or.-Or.-Or. Ratio Detector Diode Load
132	33KΩ	±	77267	BTS-33K	Or.-Or.-Or. Ratio Detector Diode Load
133	1 Meg.	±	77218	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
134	220KΩ	±	77216	BTS-220K	Red-Red-Yl. Tone Compensation
135	33KΩ	±	77267	BTS-33K	Or.-Or.-Or. " "
136	1 Meg.	±	77218	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
137	10 Meg.	±	77274	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
138	470KΩ	±	77217	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
139	470KΩ	±	77217	BTS-470K	Yl.-Vi.-Yl. Phase Inverter Plate Load
140	10 Meg.	±	77274	BTS-10 Meg.	Br.-Blk.-Blue Phase Inverter Grid
141	2.2 Meg.	±	77270	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
142	220KΩ	±	77216	BTS-220K	Red-Red-Yl. Output Grid
143	220KΩ	±	77216	BTS-220K	Red-Red-Yl. " "
144	220KΩ	±	77216	BTS-220K	Red-Red-Yl. " "
145	230Ω	5	77338	AB-250	Output Cathode-See Note 1
146	500Ω	5	77337	AB-500	Filter
147	500Ω	5	77337	AB-500	"
148	27Ω	1	77428	BW-1-27	Red-Vi.-Blk. Bias
149	3300Ω	±	77210	BTS-3300	Or.-Or.-Red Phono Shunt
150	15KΩ	±	77265	BTS-15K	Br.-Grn.-Or. " "
151	47KΩ	±	77213	BTS-47K	Yl.-Vi.-Or. Phono Amp. Grid
152	1500Ω	±	77263	BTS-1500	Br.-Grn.-Red Phono Amp. Cathode
153	2.2 Meg.	±	77270	BTS-2.2 Meg.	Red-Red-Grn. Phono Amp. Screen Dropping
154	470KΩ	±	77217	BTS-470K	Yl.-Vi.-Yl. Phono Amp. Plate Load
155	47KΩ	±	77213	BTS-47K	Yl.-Vi.-Or. Phono Amp. Decoupling
156	220KΩ	±	77216	BTS-220K	Red-Red-Yl. Phono Tone Compensation
157	47KΩ	±	77213	BTS-47K	Yl.-Vi.-Or. Phono Tone Compensation
158	100KΩ	±	77214	BTS-100K	Br.-Blk.-Yl. " " "
159	47KΩ	±	77213	BTS-47K	Yl.-Vi.-Or. " " "
198	100Ω	±	77258	BW-½-100	Br.-Blk.-Br. Parasitic Suppressor-Note 2

Note 1-On IRC replacement set slider at 230Ω from one end.
Note 2-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
160	117V AC @ 1.1A	600V CT @ .125A	5.0V AC @ 3.0A	6.3VAC @ 5.0A	94170	P-6013#	T22R05	P-2953#

#Add series resistor to reduce plate voltage.

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIR CHIEF PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
59	5000		25141	1FM-25	684-005	1D5D5	MW.5-25	3rd IF Decoupling
60	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	3rd IF Screen Bypass-Cer.
61	5000		25141	1FM-25	684-005	1D5D5	MW.5-25	3rd IF Cathode Byp.
62	5000		25141	1FM-25	684-005	1D5D5	MW.5-25	2nd IF Decoupling
63	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	2nd IF Screen Bypass-Cer.
64	5000		25141	1FM-25	684-005	1D5D5	MW.5-25	AVC Filter
65	100		25188	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter
66	100		25188	1FM-31	1468-0001	5W5T1	MO.5-31	" " "
67	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM Mixer Plate Decoup.Cer.
68	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM Mixer Screen Byp.-Cer.
69	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM Mixer Screen Decoup-Cer
70	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM Mixer Cathode Byp.-Cer
71	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	Filament Bypass-Cer.
72	25		25159	MS-425	1468-000025	5W5Q25	MO.5-425	RF Coupling-Cer.
73	100		25447	MS-31	1469-0001	5R5T1	MOS.5-31	Fixed Pad-Cer.
74	2		25275					Osc. Coupling-Cer.
75	600		25274	MS-36	1468-0005	1W5T6	MO.5-36	Osc. Plate Bypass-Cer.
76	50		25375	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.-Cer.
77	30		25329	MS-43		5R5Q3	MOS.5-43	Fixed Pad.-Cer.
78	55		25346					" " "
79	25		25159	MS-425	1468-000025	5W5Q25	MO.5-425	RF Coupling-Cer.
80	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM RF Decoupling-Cer.
81	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM RF Screen Bypass-Cer.
82	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	FM RF Screen Byp.-Cer.
83	50		25143	MS-45	1469-00005	5R5Q5	MO.5-45	RF Coupling-Cer.
84	100		25447	MS-31	1469-0001	5R5T1	MOS.5-31	Fixed Pad-Cer.
85	1500		25273	1FM-215	1467-0015	1W5D15	MW.5-215	AVC Filter-Cer.
86	215		25212					Fixed Trimmer
87	1350		25213					Fixed Padder
88	240		25349	1FM-325	1468-00025	5W5T25	MO.5-325	AM RF Coupling
89	47		25193	1FM-45	1468-00005	5W5Q5	MO.5-45	AM Osc. Grid Cap.

*Omit bypass section.
†Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIR CHIEF PART No.	IRC PART No.	CLAROSTAT PART No.	
90	3 Meg.	½	78101			Volume Control tapped @ 1.5 Meg.
91A	3.5 Meg.	½	78102	D13-140	AM-67-Z	Bass Control
B	Shaft		Not Req.	E	KSS-3	Attach to 91A per instructions
92A	1.5 Meg.	½	78103	D13-137	AM-63-Z	Treble Control
B	Shaft		Not Req.	E	KSS-3	Attach to 92A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIR CHIEF PART No.	IRC PART No.	
93	100KΩ	½	77214	BTS-100K	Br.-Blk.-Yl. FM RF Grid
94	1 Meg.	½	77218	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
95	4.7 Meg.	½	77272	BTS-4.7 Meg.	Yl.-Vi.-Grn. " "
96	100KΩ	½	77214	BTS-100K	Br.-Blk.-Yl. FM RF Screen Dropping
97	1000Ω	½	77262	BTS-1000	Br.-Blk.-Red FM RF Decoupling
98	22KΩ	½	77266	BTS-22K	Red-Red-Or. FM Oscillator Grid
99	4700Ω	1	77429	BTA-4700	Yl.-Vi.-Red FM Oscillator Plate Load
100	220KΩ	½	77216	BTS-220K	Red-Red-Yl. FM Mixer Grid
101	470Ω	½	77261	BTS-470	Yl.-Vi.-Br. FM Mixer Cathode
102	100KΩ	½	77214	BTS-100K	Br.-Blk.-Yl. FM Mixer Screen Dropping
103	1000Ω	½	77262	BTS-1000	Br.-Blk.-Red FM Mixer Screen Decoupling
104	1000Ω	½	77262	BTS-1000	Br.-Blk.-Red FM Mixer Plate Decoupling
105	100KΩ	½	77214	BTS-100K	Br.-Blk.-Yl. AVC Network
106	100KΩ	½	77214	BTS-100K	Br.-Blk.-Yl. " "
107	100KΩ	½	77214	BTS-100K	Br.-Blk.-Yl. " "
108	68KΩ	½	77305	BTS-68K	Blue-Gray-Or. AM RF Screen Dropping
109	4700Ω	1	77429	BTA-4700	Yl.-Vi.-Red AM RF Plate Load
110	1000Ω	1	77106	BTA-1000	Br.-Blk.-Red AM RF Decoupling

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PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIR CHIEF PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
161	13000Ω CT	3.9Ω	400Ω CT	.3Ω	94259	A-3870	T22888‡	A-2901‡	‡Drill one new mounting hole.
162	7000Ω	3.6Ω	470Ω	.5Ω	94258	A-3878	T22847	A-2931	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIR CHIEF PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-102**	12A6**	**Replace output transformer to match 6-8Ω voice coil.
163	PM	3.9Ω	81179	Mod. P12-S		
	CONE DIA.	VC DIA.				
164	11¾"	7/8"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			
	FIELD	VC IMP.		ST-110	6A21	
165	PM	3.6Ω	81178	Mod. P6-V		
	CONE DIA.	VC DIA.				
166	6"	3/4"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIR CHIEF PART No.	MEISSNER PART No.	
167	Loop Ant.	6Ω	.5Ω	38896		
168	FM Ant.		0Ω	11431		
169	Ant. Load. Coil		1.5Ω	38845		
170	SW Ant.Coil	.1Ω	0Ω	38605	14-1044	
171	FM " "		0Ω	38673		
172	Wave Trap		INF.	38484		
173	BC RF Coil	.3Ω	8.5Ω	38904	14-1027	
174	SW " "	.3Ω	0Ω	38903	14-1045	
175	FM " "		0Ω	38672		
176A	BC Osc. "		4.5Ω	38902		
B	SW " "		0Ω			
177	FM " "		0Ω	38673		
178A	AM Input IF	13Ω	13.5§	38621		§Includes both secondaries.
B	FM " "	.5Ω				
179A	AM Output IF	13.5Ω‡	12.5Ω	38622		‡Includes both primaries.
B	FM Inter. "		1Ω			
180	FM Output IF	1Ω	1Ω	38623		
181	Disc.Trans.	1.2Ω	.1Ω	38879		
182	Fil. Choke		.1Ω	38661		
183	RF Plate Choke		.1Ω	38661		
184	Osc. Plate Choke		.1Ω	38661		
185	Fil. Choke		.1Ω	38661		
186	" "		.1Ω	38661		
187	" "		.1Ω	38661		
188	" "		.1Ω	38661		
189	" "		.1Ω	38661		
190	" "		.1Ω	38661		

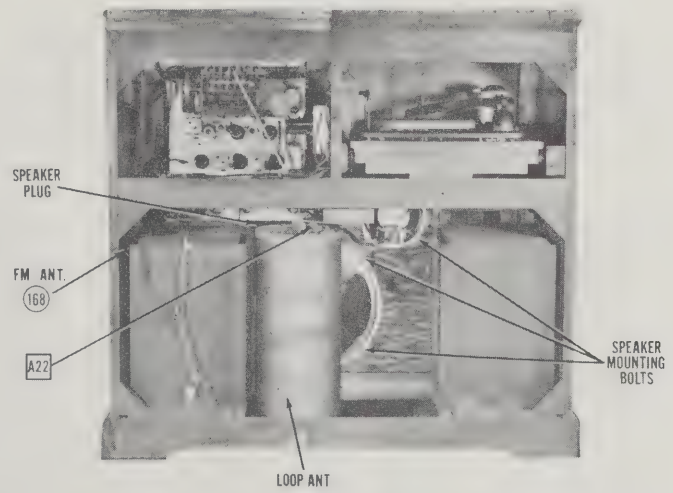
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					AIR CHIEF PART No.		
191-193	Bayonet	6-8	0.25	Blue			Type 44
194	"	"	0.15	Brown			Type 47

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	AIR CHIEF PART No.	NOTES
195	Switch	90263	Phono-Band
196	"	90264	Pushbutton
197	3 Gang Var. Cap.	26230	AM (13-475MMF) each section
199	Switch	11441	Phono Comp. Light
	Trimmer	26221	A9, A10, A11
A19			BC Osc. Adj.
A23	Trimmer Strip	26270	SW Osc. Adj.
A26			SW Osc. Pad.
A20			BC RF Adj.
A27	Trimmer Strip	26271	SW RF Pad
A21			BC Osc. Pad.
A24	Trimmer Strip	26272	SW RF Adj.
A22	Trimmer	26031	BC Ant. Adj.
A25			SW Ant. Adj.
A28	Trimmer Strip	26273	SW Ant. Pad
	Trimmer Strip	26274	B2, B4, B6, B8, B10, B12
	Pointer Assby.	13806	
	Dial Glass	31424	



DISASSEMBLY INSTRUCTIONS

1. Remove six push-on type control knobs.
2. Remove two plugs from loop antenna.
3. Remove two Phillips head wood screws holding loop antenna rotary shaft in cabinet.
4. Remove four Phillips head wood screws holding loop antenna in cabinet. Remove loop from cabinet.
5. Disconnect phono pre-amp. power supply plug.
6. Remove phono pre-amp. output plug from tuning chassis.
7. Remove phono-motor & phono-pickup plug from under record changer.
8. Remove three Phillips head wood screws holding phono pre-amp. chassis in cabinet. Remove phono pre-amp. from cabinet.
9. Remove FM dipole plug from chassis.
10. Remove two Phillips head wood screws holding phono-compartment light in cabinet.
11. Remove two Phillips head wood screws holding pilot light in front of cabinet.
12. Remove speaker plug from chassis.
13. Unsnap control panel lid support from hinge assembly.
14. Remove six Phillips head screws holding control panel in cabinet. Lift up on control panel so that chassis mounting bolts may be reached.
15. Remove two wood screws holding bottom of chassis in cabinet.
16. Remove four bolts holding chassis in cabinet. Remove chassis from cabinet.
17. Remove eight hex nuts holding the two speakers in cabinet. Remove from cabinet.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
Use insulated alignment screwdriver for all adjustments.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.
Lead to scope should be shielded and of low total capacitance.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 6SK7 2nd IF Tube (7). Low side to chassis.	10.7MC (freq. modulated)	FM (3rd position clock-wise)	Tuning cap. fully open.	Vertical input in series with 1 Meg. resistor to Point A. Ground to chassis.	A1, A2 A3.	Disconnect 4 MFD cap. from Point A. Shunt a 3900Ω resistor across the primary of ratio detector transformer (181). Turn A8 out as far as possible. Then adjust A1, A2, and A3 in order given for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
2	.1 MFD.	High side to Pin 4 (grid) 6SK7 1st IF Tube (6). Low side to chassis.	"	"	"	"	A4,A5	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 2.
3	.1 MFD. cap. in series with 10KΩ resistor.	High side to Pin 1 (grid) 6AG5 FM Mixer Tube (3). Low side to chassis.	"	"	"	"	A6,A7	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 3.
4	"	"	"	"	"	Vertical input in series with 1 Meg. resistor to Point B. Ground to chassis.	A8	Remove 3900Ω loading resistor from Step 1. Reconnect 4 MFD cap. to Point A. Adjust A8 for maximum straightness of diagonal line with center of line at the horizontal sweep line per Fig. 4.
						CONNECT VTVM		
5	.1 MFD.	"	10.7MC (unmodulated)	"	"	DC probe of VTVM in series with 1 Meg. resistor to Point A. Common to chassis.		Check sensitivity. 65 mi microvolts input should develop .55 volt rise on AVC line. (Measure with VTVM in series with 1 Meg. resistor). Continue with Step 8.

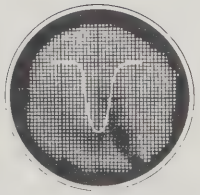


FIG. 1

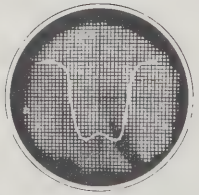


FIG. 2

FIG. 3

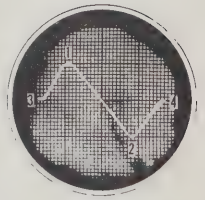
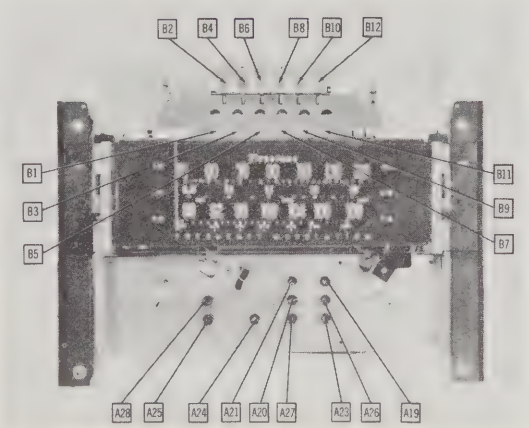


FIG. 4

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
10	.1 MFD.	High side to Pin 8 (grid) 6SA7. Low side to chassis.	455KC	BC (1 position clockwise)	Tuning cap. fully open.	Across voice coil	A15, A16	Adjust for maximum output
11	.1 MFD.	"	"	"	"	"	A17, A18	" " " "
12	.1 MFD.	High side to Pin 4 (grid) 6SK7 AM RF Tube (2). Low side to chassis.	1500KC	"	1500KC	"	A19, A20	" " " "
13	.1 MFD.	"	600KC	"	Tune for maximum output.	"	A21	Rock tuning cap. and adjust for maximum output. Repeat Steps 12 & 13 until no further improvement can be made.
14	RMA Dummy	High side to ext. ant. terminal. Low side to chassis.	1500KC	"	"	"	A22	Adjust for maximum output
15	400Ω carbon res.	"	15MC	"	15MC	"	A23	Tighten A23 firmly. Loosen to second peak. Adjust for maximum output. Tune sig. gen. to approximately 15.91MC. If image is not heard retune sig. gen. to 15MC and loosen A23 to next peak. Adjust for maximum output and recheck for image.
16	"	"	"	"	Tune for maximum output.	"	A24, A25	Rock tuning cap. and adjust for maximum output.
17	"	"	9.4MC	"	9.4MC	"	A26	Adjust for maximum output. Tune sig. gen. to 10.31MC. If signal is not heard open A26 to next peak, adjust for maximum output and recheck for image.
18	"	"	"	"	Tune for maximum output.	"	A27, A28	Rock tuning cap. and adjust for maximum output. Repeat Steps 15, 16, 17 & 18 until no further improvement can be made.



FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

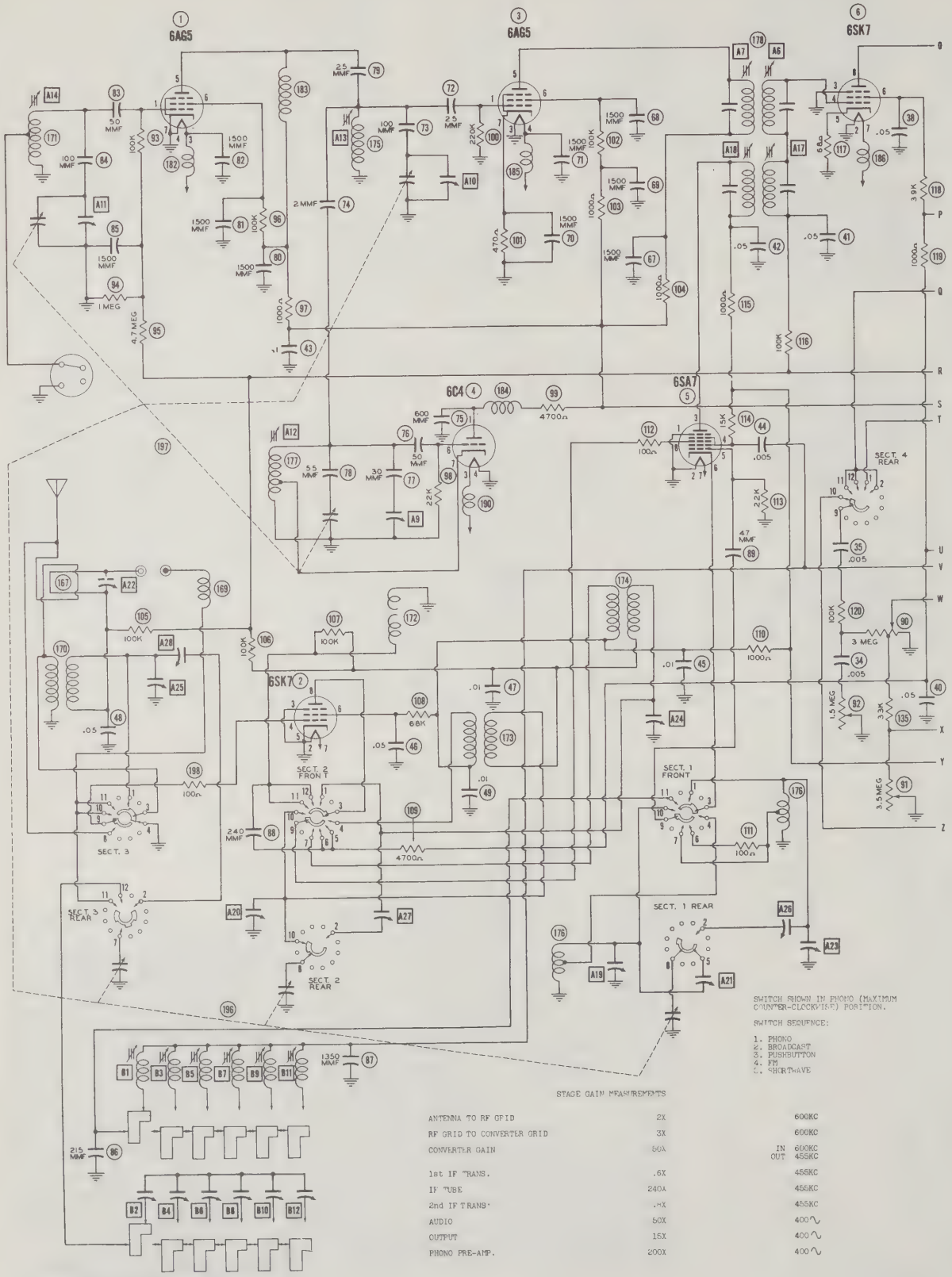
In each step attenuate output of signal generator to maintain a voltage reading no greater than 3 volts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 6SK7 3rd IF Tube (8). Low side to chassis.	10.7MC (unmodulated)	FM (3rd position clockwise)	Tuning cap. fully open.	DC probe in series with 1 Meg. resistor to Point (A) Common to chassis.	A1	Turn A8 out as far as possible. Adjust A1 for maximum deflection.
2	.1 MFD.	High side to Pin 4 (gird) 6SK7 2nd IF Tube (7). Low side to chassis.	"	"	"	"	A3	Turn A2 out as far as possible. Adjust A3 for maximum deflection.
3	.1 MFD.	"	"	"	"	"	A2	Adjust for maximum deflection.
4	.1 MFD.	High side to Pin 4 (grid) 6SK7 1st IF Tube (6). Low side to chassis.	"	"	"	"	A5	Turn A4 out as far as possible. Adjust A5 for maximum deflection.
5	.1 MFD.	"	"	"	"	"	A4	Adjust for maximum deflection.
6	.1 MFD.	High side to Pin 1 (grid) 6AG5 FM Mixer Tube (3). Low side to chassis.	"	"	"	"	A7, A6	Turn A6 out as far as possible. Adjust A7 for maximum deflection. Then adjust A6 for maximum deflection.
7	.1 MFD.	"	10.7MC (400∿ modulation 200 microvolts input)	"	"	Output meter across voice coil	A8	Adjust for minimum audio output. Continue with Step 8.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8	330Ω carbon res.	High side to ungrounded terminal of FM ant. socket. Low side to chassis.	108MC (unmodulated)	FM	108MC	DC probe in series with 1 Meg. resistor to Point (A) Common to chassis.	A9, A10, A11	Adjust for maximum deflection.
9	"	"	88MC	"	88MC	"	A12, A13, A14	Adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made.

DATE 5/48-#498-7 SET #39-FOLDER #7



STAGE GAIN MEASUREMENTS

ANTENNA TO RF GRID	2X	600KC
RF GRID TO CONVERTER GRID	3X	600KC
CONVERTER GAIN	50A	IN 600KC OUT 455KC
1st IF TRANS.	.6X	455KC
IF TUBE	240A	455KC
2nd IF TRANS.	.4X	455KC
AUDIO	50X	400∿
OUTPUT	15X	400∿
PHONO PRE-AMP.	200X	400∿

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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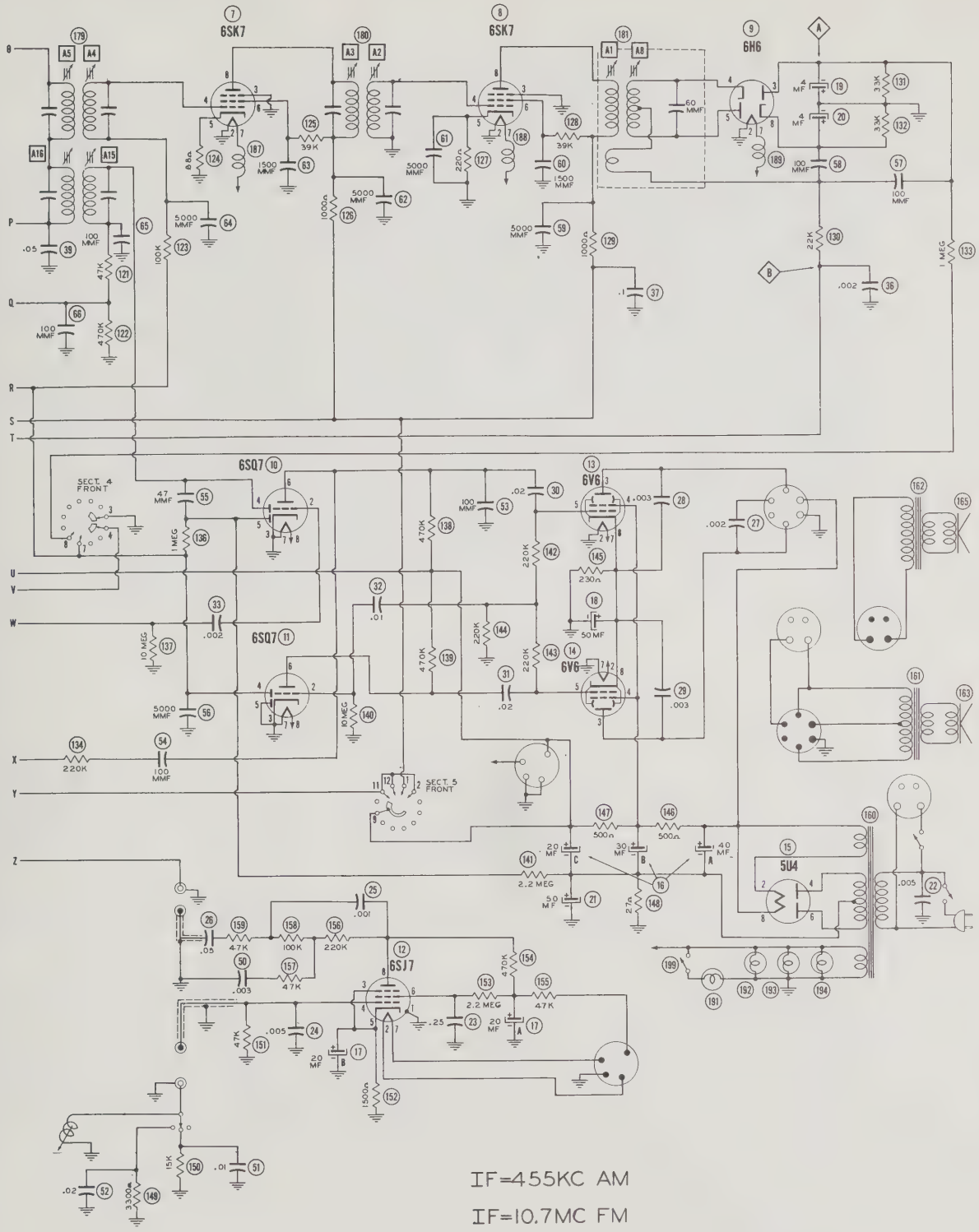
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	-.5VDC	0V.	6.25VAC	0V.	240VDC	80VDC	0V.	-
	2	6SK7	0V.	6.3VAC	0V.	-.5VDC	0V.	92VDC	0V.	280VDC
‡	3	6AG5	0V.	2.4VDC	0V.	6.25VAC	245VDC	127VDC	2.4VDC	-
‡	4	6C4	190VDC	0V.	0V.	6.25VAC	190VDC	-7VDC§	0V.	-
	5	6SA7	0V.	6.3VAC	290VDC	115VDC	-17VDC§	0V.	0V.	-.45VDC
	6	6SK7	0V.	6.25VAC	0V.	-.4VDC	1VDC	125VDC	0V.	280VDC
‡	7	6SK7	0V.	6.25VAC	0V.	-.4VDC	1VDC	115VDC	0V.	242VDC
‡	8	6SK7	0V.	6.25VAC	0V.	0V.	3.3VDC	127VDC	0V.	260VDC
‡	9	6H6	0V.	0V.	-.6VDC	0V.	0V.	0V.	6.25VAC	.5VDC
	10	6SQ7	0V.	-.5VDC	0V.	-.5VDC	-.6VDC	92VDC	0V.	6.3VAC
	11	6SQ7	0V.	-.8VDC	0V.	-.6VDC	0V.	95VDC	0V.	6.3VAC
	12	6SJ7	0V.	6.3VAC	1VDC	0V.	1VDC	20VDC	0V.	35VDC
	13	6V6G	0V.	0V.	330VDC	315VDC	0V.	0V.	6.3VAC	19VDC
	14	6V6G	0V.	0V.	330VDC	315VDC	0V.	0V.	6.3VAC	19VDC
	15	5U4G	0V.	315VDC	0V.	300VAC	0V.	300VAC	0V.	315VDC

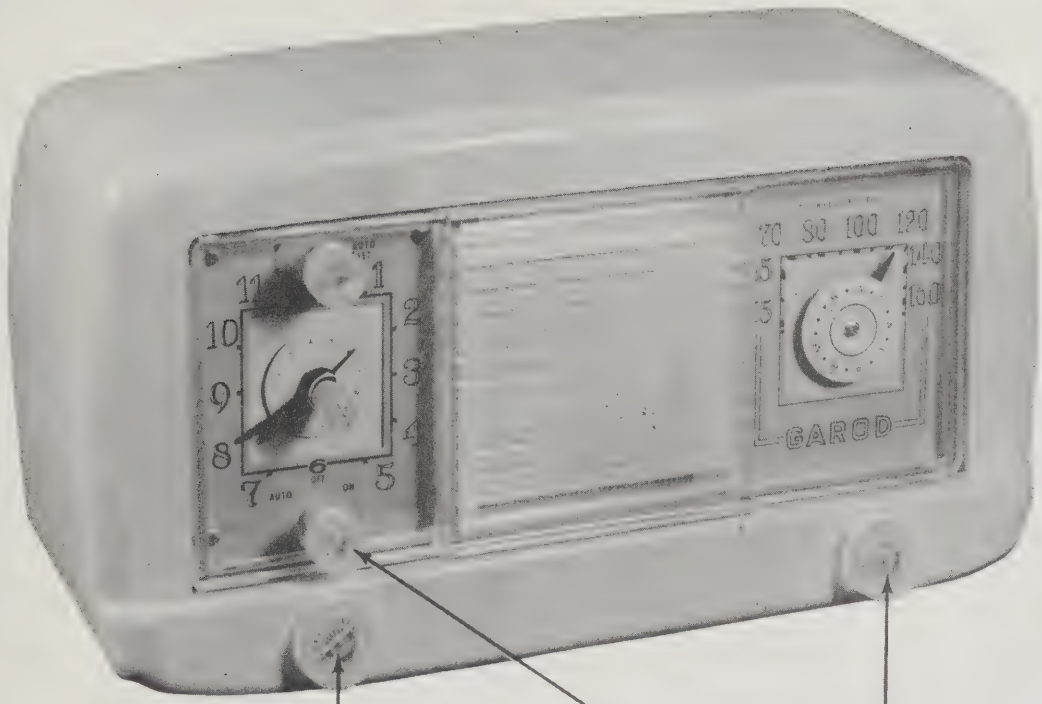
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	800KΩ	0Ω	.2Ω	0Ω	100KΩ	200KΩ	0Ω	-
	2	6SK7	0Ω	.1Ω	0Ω	2.5 Meg.	0Ω	168KΩ	0Ω	100KΩ
‡	3	6AG5	220KΩ	470Ω	0Ω	.2Ω	100KΩ	200KΩ	470Ω	-
‡	4	6C4	105KΩ	INF.	0Ω	.2Ω	105KΩ	22KΩ	0Ω	-
	5	6SA7	0Ω	.1Ω	100KΩ	115KΩ	22KΩ	1Ω	0Ω	2.5 Meg.
	6	6SK7	0Ω	.2Ω	0Ω	2.5 Meg.	68Ω	139KΩ	0Ω	100KΩ
‡	7	6SK7	0Ω	.2Ω	0Ω	800KΩ	68Ω	140KΩ	0Ω	100KΩ
‡	8	6SK7	0Ω	.2Ω	0Ω	1Ω	200Ω	140KΩ	0Ω	100KΩ
‡	9	6H6	0Ω	0Ω	33KΩ	INF.	INF.	INF.	.2Ω	33KΩ
	10	6SQ7	0Ω	10 Meg.	0Ω	600KΩ	1.7 Meg.	575KΩ	0Ω	.1Ω
	11	6SQ7	0Ω	10 Meg.	0Ω	2.2 Meg.	0Ω	575KΩ	0Ω	.1Ω
	12	6SJ7	0Ω	.1Ω	1.5KΩ	47KΩ	1.5KΩ	2.3 Meg.	0Ω	600KΩ
	13	6V6G	0Ω	0Ω	100KΩ	100KΩ	500KΩ	INF.	.1Ω	230Ω
	14	6V6G	0Ω	0Ω	100KΩ	100KΩ	500KΩ	INF.	.1Ω	230Ω
	15	5U4G	INF.	100KΩ	INF.	70Ω	INF.	65Ω	INF.	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



GAROD MODEL
5RC-1

GAROD MODEL
5RC-1

GAROD MODEL 5RC-1

TRADE NAME	Garod, Model 5RC-1
MANUFACTURER	Garod Radio Corp., 70 Washington St., Brooklyn 1, N.Y.
TYPE SET	AC Operated Superheterodyne Receiver with Electric Clock-Radio Alarm
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1650KC RATING .36 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1650KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GAROD PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GAROD PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	40	150	C-5.415-1	TA-440	PRSA150-40-40	EZ443150	DSB-403020-150	Filter - Blue
B	40	150						" - Red
C	20	150		UT-201	PRS150-20			" - Grn.
6A	20	150	5.415-1	TA-220	PRSA150-20-20	EZ42215	DSB-403020-150	Alternate-Filter
B	20	150						" "
C	20	150		UT-201	PRS150-20			" "
7	.05	400		TC-15	484-05	DT4S5	S-4-05	Line Filter
8	.02	400		TC-12	484-02	DT4S2	S-4-02	Output Plate Bypass
9	.01	400		TC-11	484-01	DT4S1	S-4-01	Audio Coupling
10	.01	400		TC-11	484-01	DT4S1	S-4-01	" "
11	.01	400		TC-11	484-01	DT4S1	S-4-01	IF Coupling
12	.02	200		TC-12	484-02	DT2S2	S-2-02	AVC Filter
13	.005	600		TC-25	684-005	DT6D5	S-6-005	Ext. Ant. Isolation
14	.25	200		TC-2	484-.25	DT2P25	S-2-25	Line Isolation
15	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass-Cer.
16	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter- "

Note-Some models use 270Ω in this application. IRC replacement BW-½-270.
*Omit bypass section.

CONTROLS

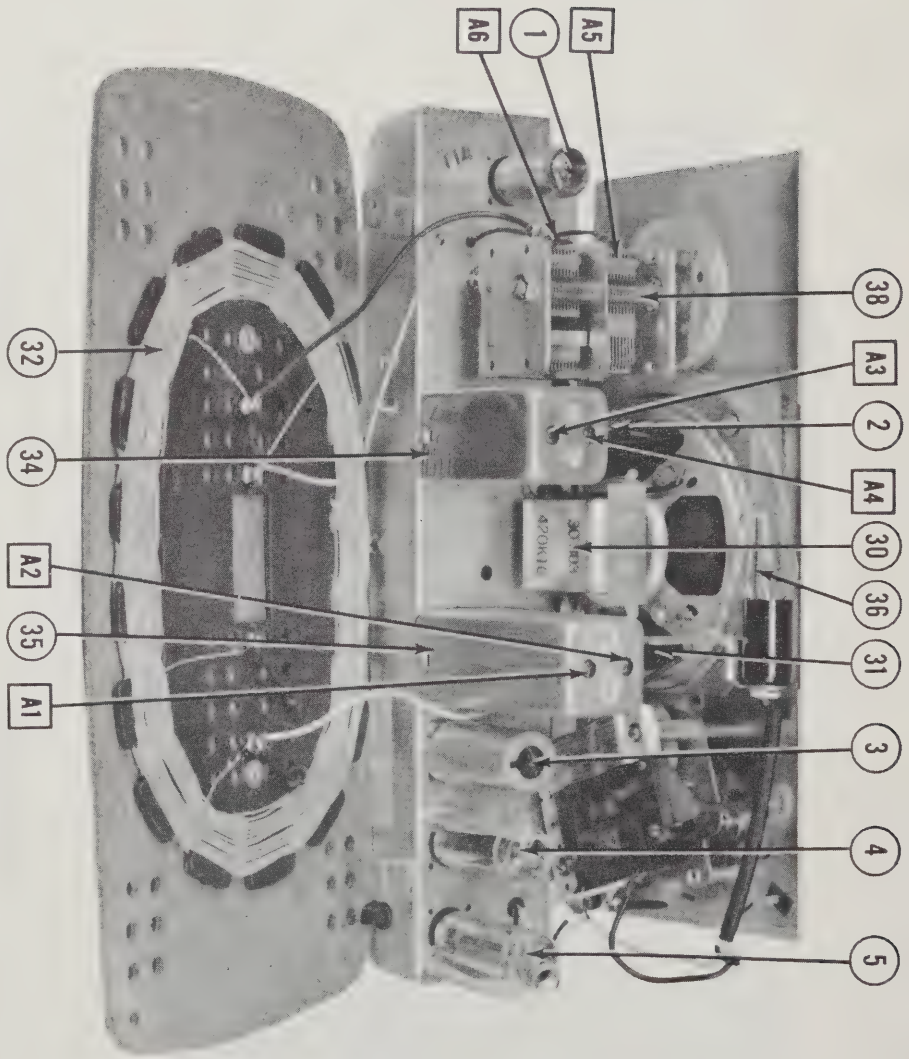
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GAROD PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½	8.200-11	D13-137†	AM-63-Z†	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 17A per instructions

†Install a 47KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft side, terminals down.)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GAROD PART No.	IRC PART No.	
18	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
19	2.2 Meg.	½		BTS-2.2 Meg	Red-Red-Grn. IF Grid
20	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
21	150Ω	½		BW-½-150	Br.-Grn.-Br. IF Cathode-See Note
22	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
23	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
24	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
25	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
26	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
27	1000Ω	1		BTS-1000	Br.-Blk.-Red Filter
28	100Ω	½		BW-½-100	Br.-Blk.-Br. "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GAROD	STANCOR	THORDAR'N	MERIT	
	PRI.	SEC.	PRI.	SEC.	PART No.	PART No.	PART No.	PART No.	
29	1800Ω	3.3Ω	150Ω	.4Ω	9.200	A-3876‡	T22545‡	A-2928‡	‡Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GAROD PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
30A	PM	3.3Ω	30.303		4A07	
B			30.300			Alternate Speaker
C			30.316			" "
	CONE DIA.	VC DIA.				
31	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

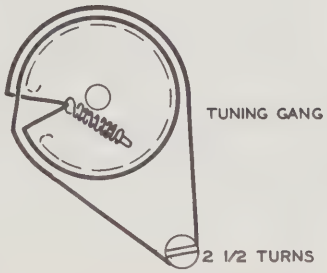
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	GAROD PART No.	MEISSNER PART No.	
32	Loop Ant.	.2Ω	1.2Ω	1.464		
33	Osc. Coil	.5Ω	7Ω	1.402	14-1060#	#Add 50MMFD from osc. grid to high side tuning cap.
34	Input IF	42Ω	42Ω	1.259	16-6658	
35	Output IF	42Ω	42Ω	1.409	16-6660	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					GAROD PART No.		
36	Screw	120					Type C-7

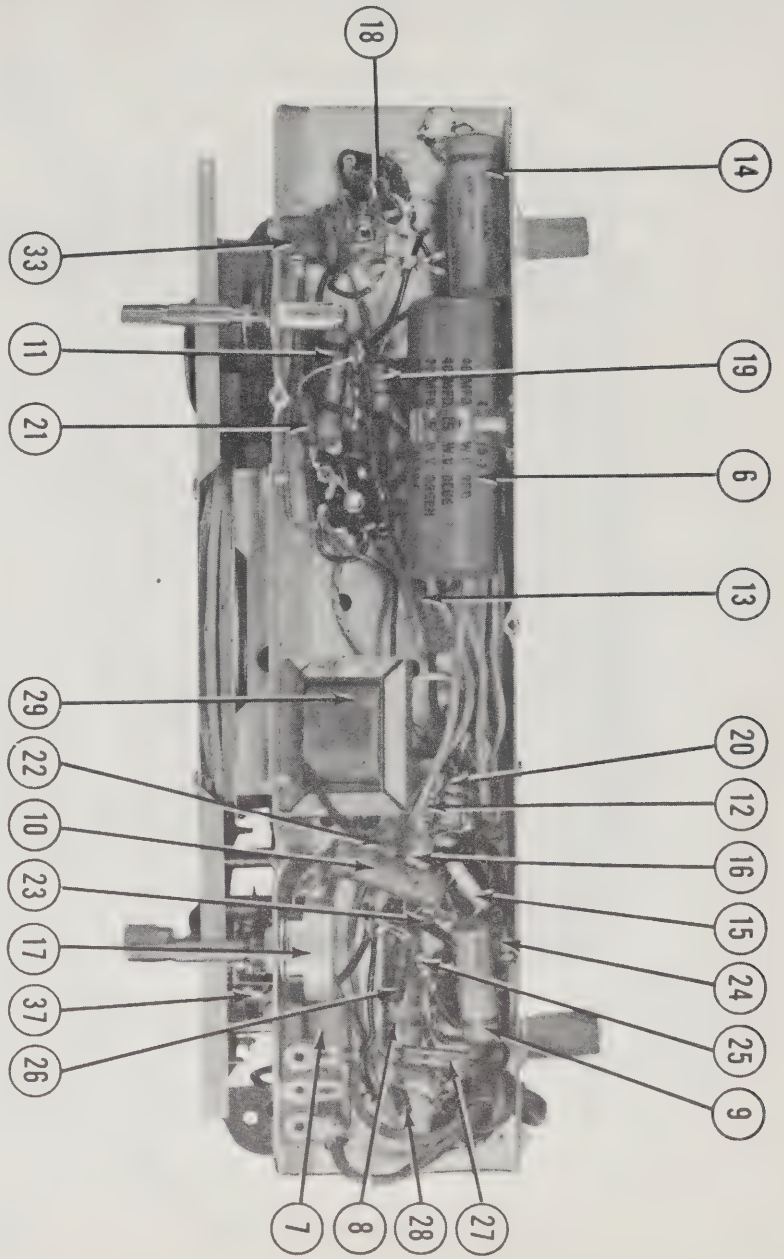
MISCELLANEOUS

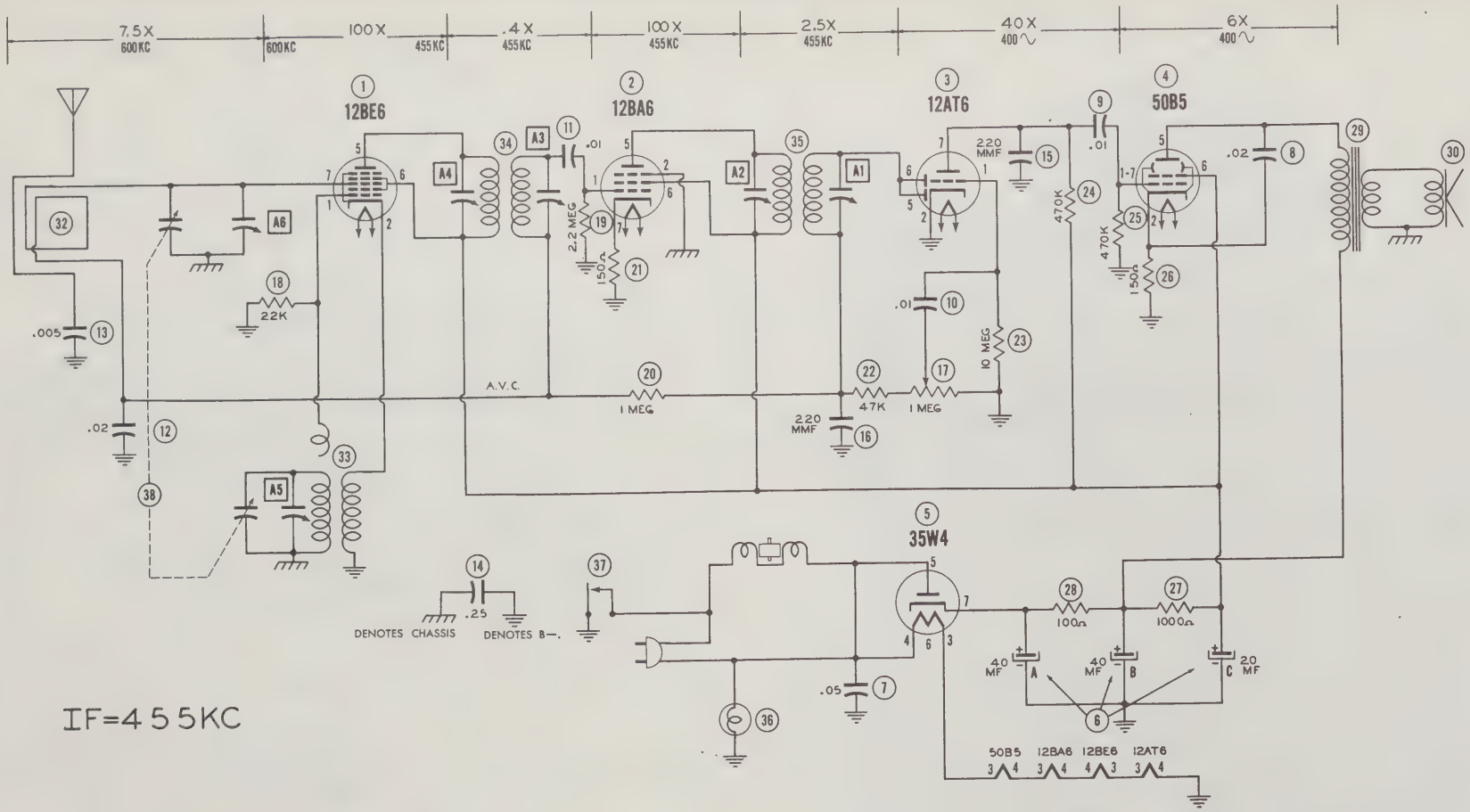
ITEM No.	PART NAME	GAROD PART No.	NOTES
37	Switch		On-Off-Automatic
38	2 Gang Var. Cap.	2.213	(13-355MMF, 25-188MMF)
	Clock Assby.	36.113	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-10VDC§	0V.	11VAC	23VAC	100VDC	100VDC	-.05VDC
2	12BA6	0V.	0V.	36VAC	25VAC	100VDC	100VDC	1.6VDC
3	12AT6	-.8VDC	0V.	11VAC	0V.	-.2VDC	-.2VDC	57VDC
4	50B5	0V.	7.5VDC	80VAC	36VAC	116VDC	100VDC	0V.
5	35W4	125VDC	125VDC	80VAC	117VAC	117VAC	110VAC	130VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	.5Ω	11Ω	20Ω	150KΩ	150KΩ	2 Meg.
2	12BA6	4.5 Meg.	0Ω	30Ω	20Ω	150KΩ	150KΩ	150Ω
3	12AT6	10 Meg.	0Ω	11Ω	0Ω	1 Meg.	1 Meg.	620KΩ
4	50B5	470KΩ	160Ω	60Ω	30Ω	150KΩ	150KΩ	470KΩ
5	35W4	150KΩ	150KΩ	60Ω	75Ω	75Ω	70Ω	150KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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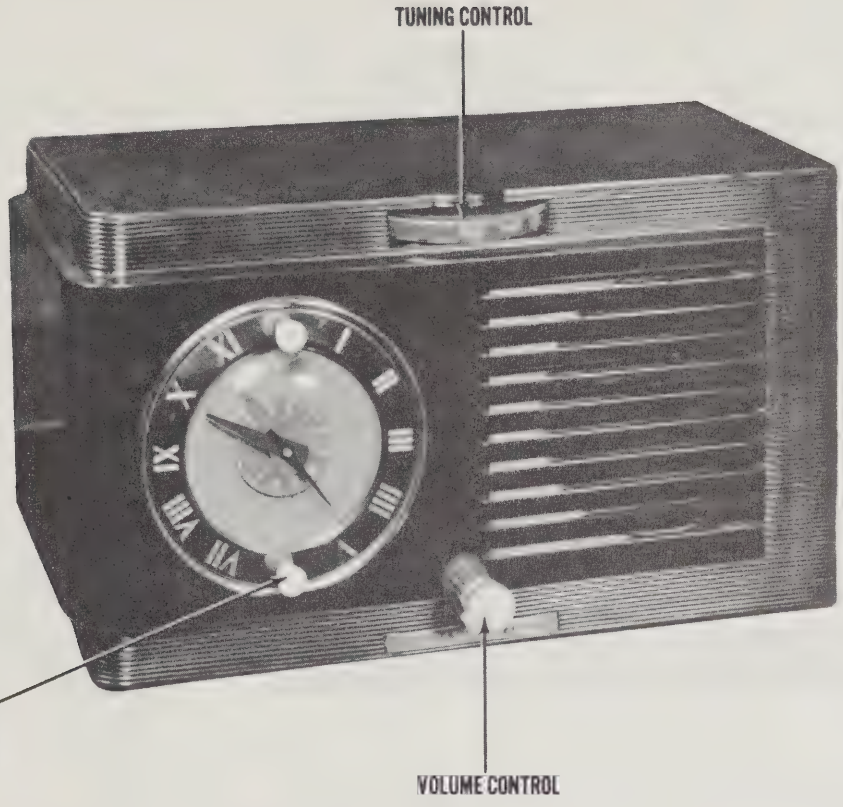
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



GENERAL ELECTRIC
MODELS 60, 62

GENERAL ELECTRIC
MODELS 60, 62

GENERAL ELECTRIC MODEL 60

TRADE NAME	General Electric, Models 60, 62
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC Operated Superheterodyne Receiver with Electric Clock-Radio Alarm
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .26 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning cap. fully closed the 550KC calibration mark should be approximately 3/16" from index mark. If it does not, remove wheel from tuning cap. and reposition. CAUTION do not attempt to correct position of wheel by rotating wheel as this will cause it to slip.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 4 (grid) 12SK7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.05 MFD	High side to Pin 8 (grid) 12SA7. Low side to B-.	"	"	"	A3,A4	Adjust for maximum output. Reinstall receiver in cabinet. See prealignment notes for dial pointer setting.
3	200MMFD	High side to ext. ant. lug. Low side to chassis.	1500KC	1500KC	"	A5	"
4	200MMFD	"	"	Tune for maximum output.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
MODELS 60, 62

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GEN. ELECT. PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7	12SA7	6R	
2	IF Amp.	12SK7	12SK7	6N	
3	Det.-AVC-AF	12SQ7	12SQ7	6Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GEN. ELECT. PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	50	150	RCE-050	TA-505	PRSA150-50-50	EZ5S15	DSB-2x50-150	Filter-Red
B	50	150						" "
7	.05	600		TC-15	684-05	DT6S5	MPH-6-05	Line Filter
8	.003	600	UCC-623	TC-23	684-003	DT6D3	S-6-003	Output Plate Bypass
9	.01	400	UCC-630	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
10	.01	200	UCC-630	TC-11	484-01	DT2S1	S-4-01	" "
11	.05	400	UCC-635	TC-15	484-05	DT4S5	S-4-05	RF Bypass Pwr. Supply
12	.05	200	UCC-635	TC-15	484-05	DT2S5	S-4-05	AVC Filter
13	.05	400	UCC-635	TC-15	484-05	DT4S5	S-4-05	Line Isolation
14	.01	400	UCC-630	TC-11	484-01	DT4S1	S-4-01	Ext. Ant. Coupling
15	220	500	UCU-036	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
16	220	500	UCU-036	1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter
17	47	500	UCW-020	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.

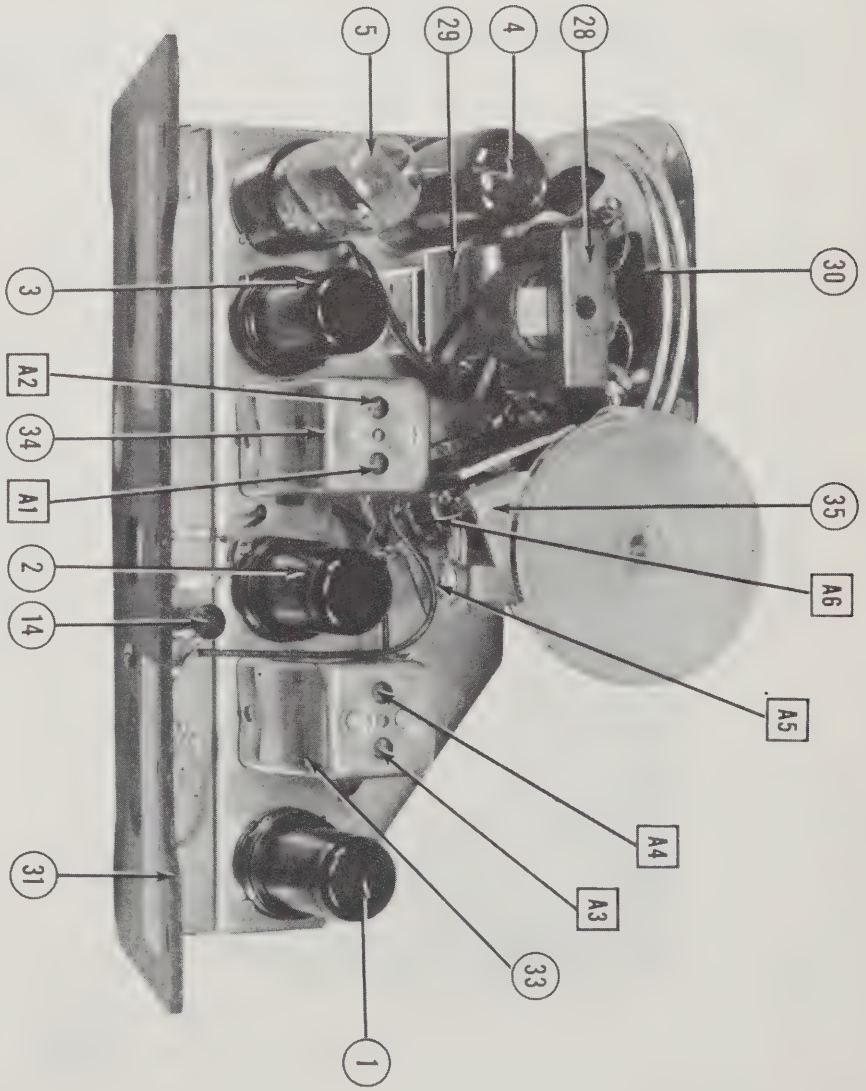
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GEN.ELECT. PART No.	IRC PART No.	CLAROSTAT PART No.	
18A	500KΩ	½	RRC-054	Dlo-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 18A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GEN.ELECT. PART No.	IRC PART No.	
19	470KΩ	½	URD-113	BTS-470K	Yl.-Vl.-Yl. Line Isolation
20	22KΩ	½	URD-081	BTS-22K	Red-Red-Or. Oscillator Grid
21	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
22	6.8 Meg.	½	URD-141	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
23	470KΩ	½	URD-113	BTS-470K	Yl.-Vl.-Yl. AF Plate Load
24	470KΩ	½	URD-113	BTS-470K	Yl.-Vl.-Yl. Output Grid
25	150Ω	½	URD-029	BW-½-150	Br.-Grn.-Br. Output Cathode
26	1200Ω	2	URW-051	BT-2-1200	Br.-Red-Red Filter
27	18Ω	1	RRW-008	BW-1-18	Br.-Gray-Blk Surge Limiter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GEN. ELECT. PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
28	2200Ω	3.4Ω	200Ω tapped @ 6Ω	.5Ω	RTO-034	A-3876*		A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket and add extra filter to reduce hum level.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GEN. ELECT. PART No.	JENSEN PART No.	QUAM PART No.	
29	FIELD PM	VC IMP. 3.4Ω	UOP-418	ST-113† Mod. P4-X	4A07†	†Drill and tap magnet frame.
30	CONE DIA. 4"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

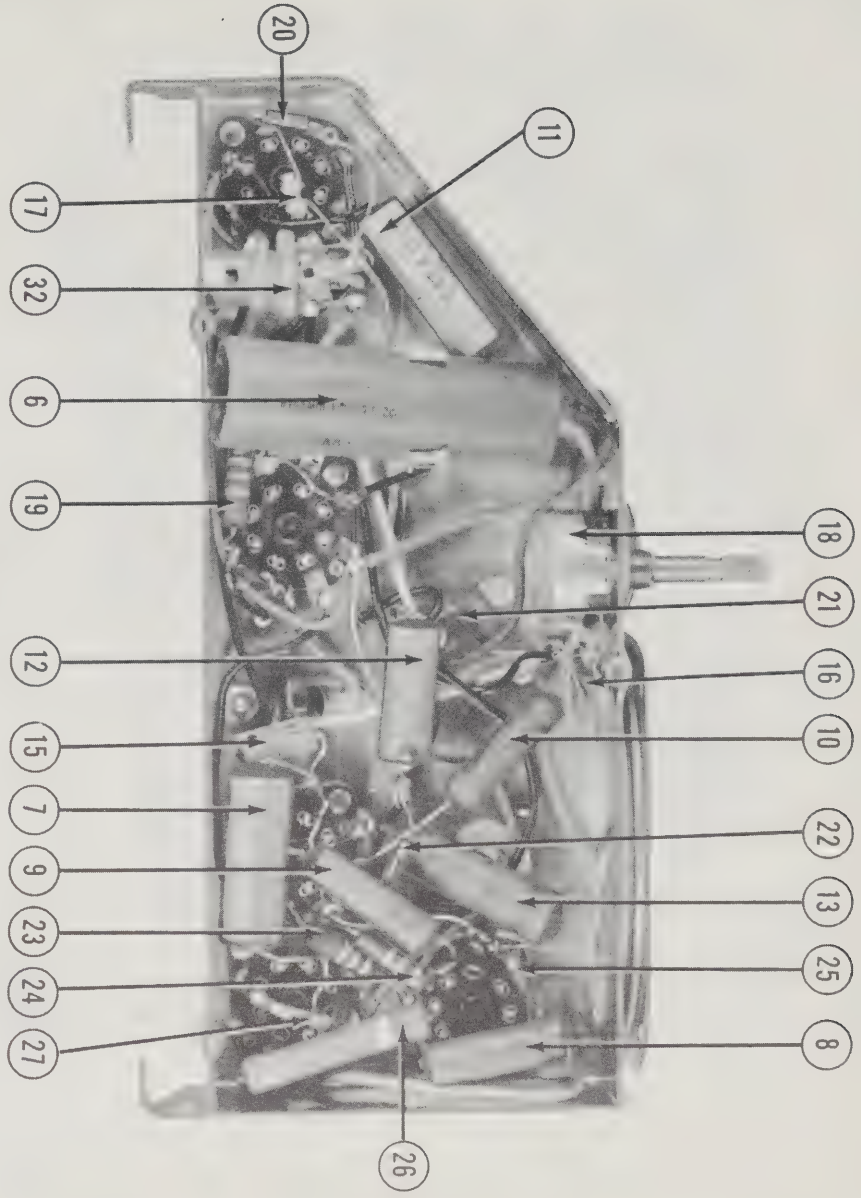
R F COILS

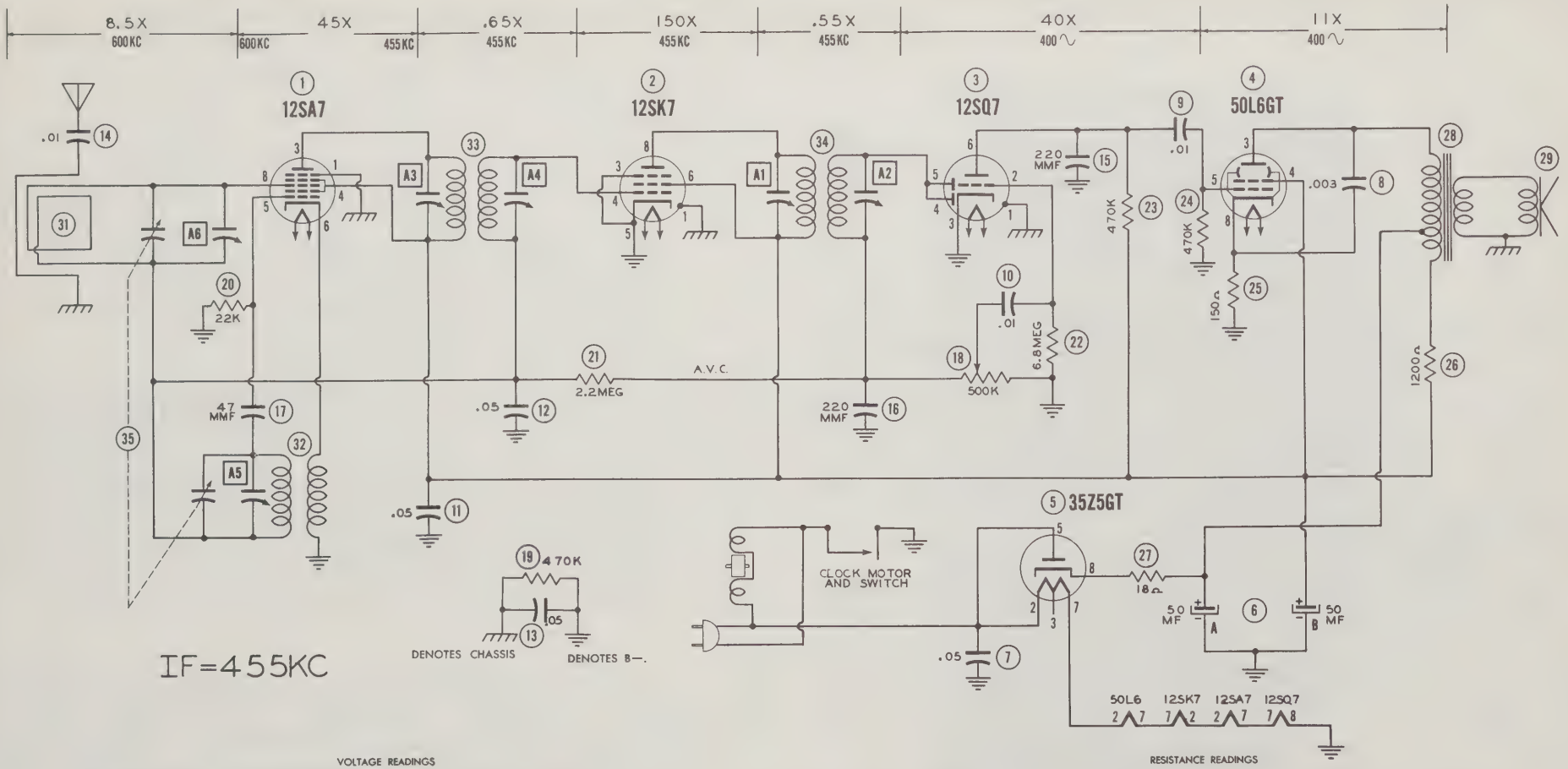
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	GEN.ELECT. PART No.	MEISSNER PART No.
31	Loop Ant.	.1Ω	2.2Ω	RAB-054	
32	Osc. Coil	.6Ω	7Ω	RLC-051	14-1060
33	Input IF	17Ω	17Ω	RTL-050	16-6658
34	Output IF	23Ω	23Ω	RTL-051	16-6660

MISCELLANEOUS

ITEM No.	PART NAME	GEN.ELECT. PART No.	NOTES
35	2 Gang Var. Cap.	RCT-021	(23-466MMF, 21-148MMF)
	Dial Scale	RDS-047	Model 60
	" "	RDS-050	Model 62
	Clock	RZC-005	60~
	"	RZC-006	50~

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	25VAC	92VDC	92VDC	-14VDC§	0V.	12.5VAC	-.6VDC
2	12SK7	0V.	25VAC	0V.	-.6VDC	0V.	92VDC	37VAC	92VDC
3	12SQ7	0V.	-.7VDC	0V.	-.5VDC	-.5VDC	45VDC	12.5VAC	0V.
4	50L6GT	0V.	81VAC	120VDC	92VDC	0V.	0V.	37VAC	5.4VDC
5	35Z5GT	0V.	117VAC	109VAC	130VDC	117VAC	130VDC	81VAC	130VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	470KΩ	23Ω	150KΩ	150KΩ	22KΩ	.6Ω	12Ω	3 Meg.
2	12SK7	470KΩ	23Ω	0Ω	3 Meg.	0Ω	150KΩ	36Ω	150KΩ
3	12SQ7	470KΩ	6.9 Meg.	0Ω	500KΩ	500KΩ	620KΩ	12Ω	0Ω
4	50L6GT	INF.	85Ω	150KΩ	151KΩ	470KΩ	0Ω	36Ω	140Ω
5	35Z5GT	INF.	119Ω	110Ω	150KΩ	119Ω	150KΩ	85Ω	150KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

GENERAL TELEVISION
MODEL 9B6P

GENERAL TELEVISION
MODEL 9B6P

GENERAL TELEVISION MODEL 9B6P

TRADE NAME	General Television, Model 9B6P
MANUFACTURER	General Television & Radio Corp., 2701 Lehmann St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, (2) 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE--BROADCAST	540-1740 RATING .39 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial.
Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1700KC	1700KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

GENERAL TELEVISION
MODEL 9B6P

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GEN. TELE. PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7GT	12SK7GT	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	" "	50L6GT	50L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GEN. TELE. PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	3-3	TA-240	PRSA150-20-40	EDL4215	DSB-3x20-150*	Filter-Red
B	20	150						" -Blue
8	.1	600		TC-1	684-.1	DT6P1	MPH-6-1	Line Filter
9	.02	400		TC-12	484-02	DT4S2	S-4-02	Output Plate Bypass
10	.02	400		TC-12	484-02	DT4S2	S-4-02	" " "
11	.01	200		TC-11	484-01	DT2S1	S-4-01	Audio Coupling
12	.01	200		TC-11	484-01	DT2S1	S-4-01	" "
13	.05	600		TC-15	684-05	DT6S5	S-6-05	AVC Filter
14	270	500		1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
15	270	500		1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter

*Parallel 2 sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. TELE. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	½	20-1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

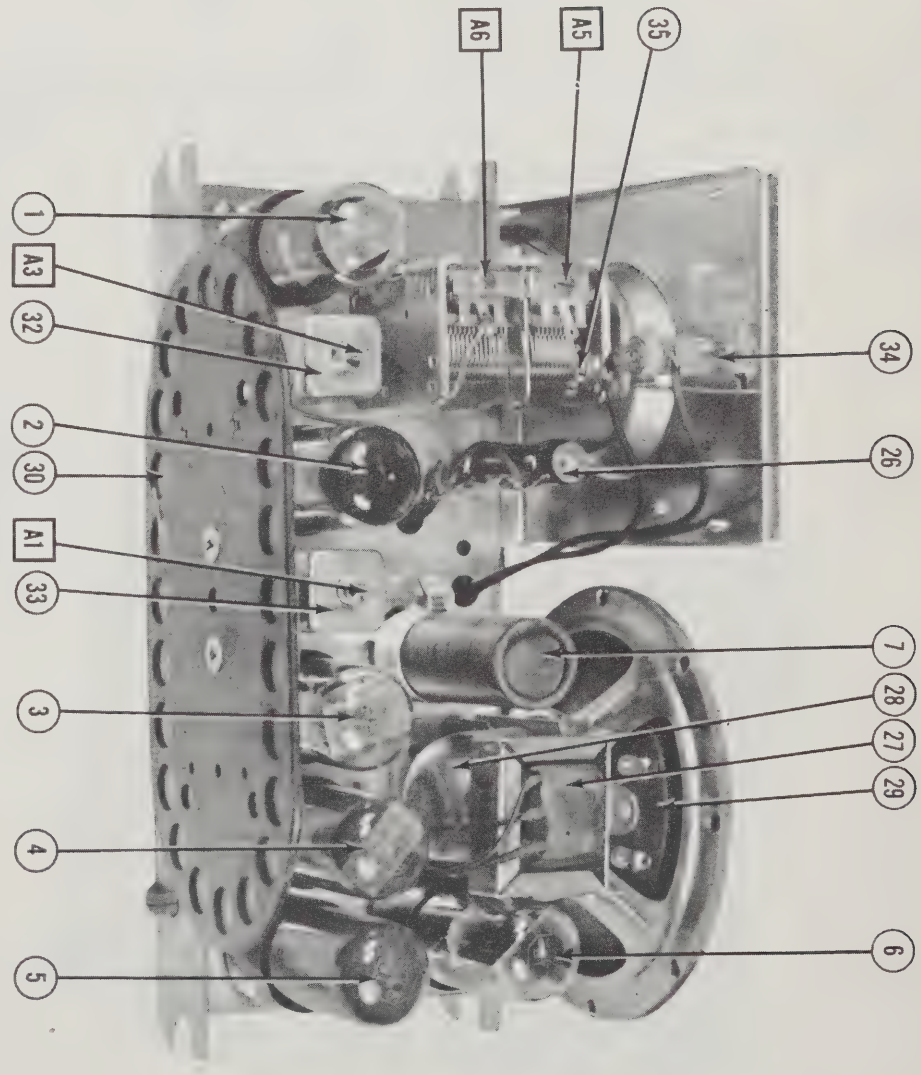
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. TELE. PART No.	IRC PART No.	IDENTIFICATION CODES
17	20KΩ	½		BTS-22K	Red-Blk.-Or. Oscillator Grid
18	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AVC Network
19	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
20	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. AF Plate Load
22	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Output Grid
23	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
24	2000Ω	1		BTA-2200	Red-Blk.-Red Filter
25	10Ω	2		BW-½-10	Br.-Blk.-Blk. Line Dropping
26	460Ω	15		DHA-500	Line Dropping-See Note

Note-On IRC replacement set slider at 460Ω from one end.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GEN. TELE. PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
27	6000Ω CT	3.4Ω	300Ω CT	.8Ω	Part of 8-9	A-3856[1]	T22S46[1]	A-2900[1]	[1]Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA GEN. TELE. PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
28	FIELD / PM	VC IMP. / 3.4Ω	8-9	ST-109† Mod. P5-V	5A15†	†Fabricate new mounting bracket.
29	CONE DIA. / 4-3/4"	VC DIA. / 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

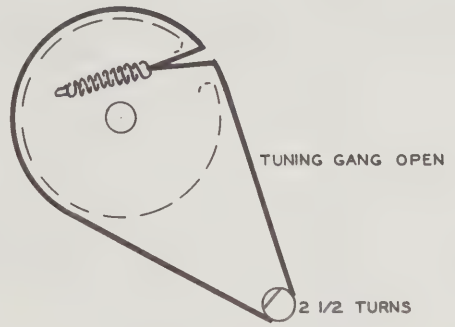
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA GEN. TELE. PART No.	MEISSNER PART No.	
30	Loop Ant.		2.8Ω	32-5A		
31	Osc. Coil	.9Ω	5.4Ω	14-3	14-1060‡	‡Add 50MMFD from osc. grid to high side tuning cap.
32	Input IF	10Ω	10Ω	15-3	16-6668	
33	Output IF	10Ω	10Ω	15-3	16-6669	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA GEN. TELE. PART No.		INSTALLATION NOTES
34	Bayonet	6-8	0.15	Brown			Type 47

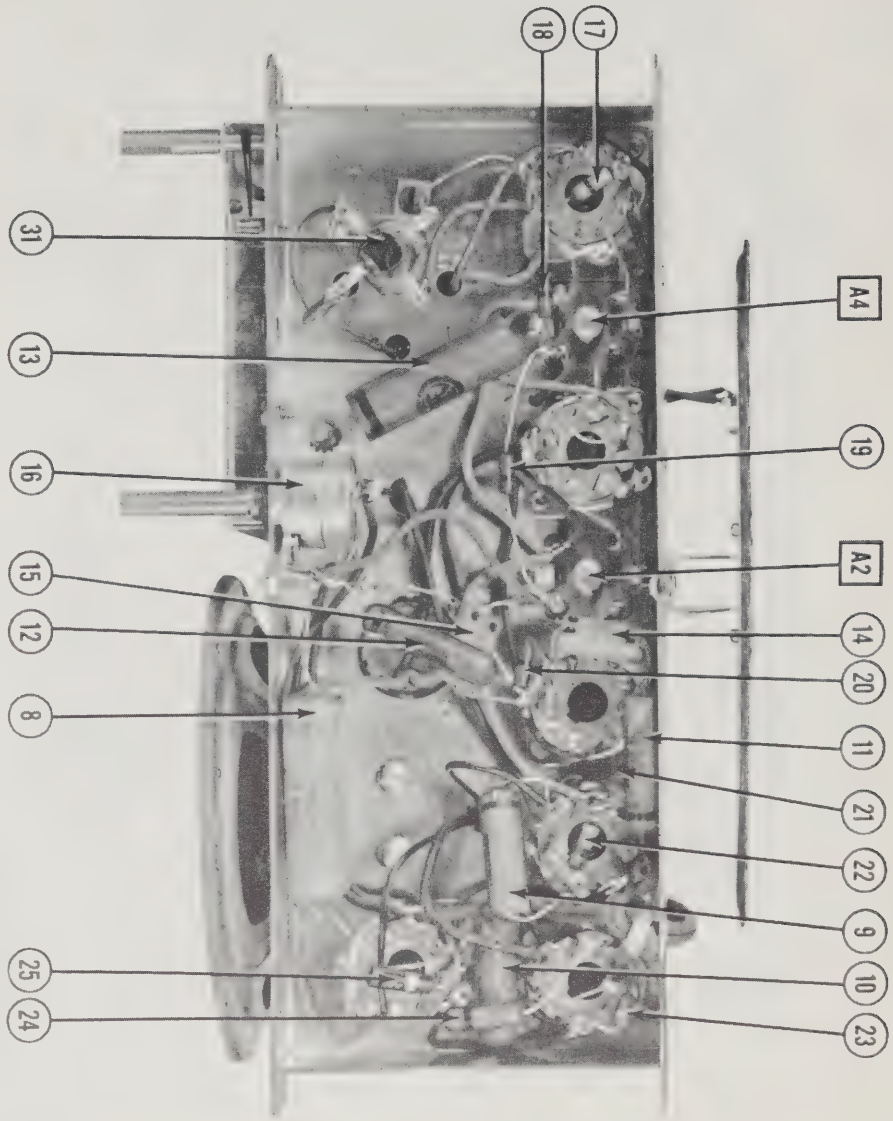
MISCELLANEOUS

ITEM No.	PART NAME	GEN. TELE. PART No.	NOTES
35	2 Gang Var. Cap.	6-1G	(24-454MMF, 31-196MMF)

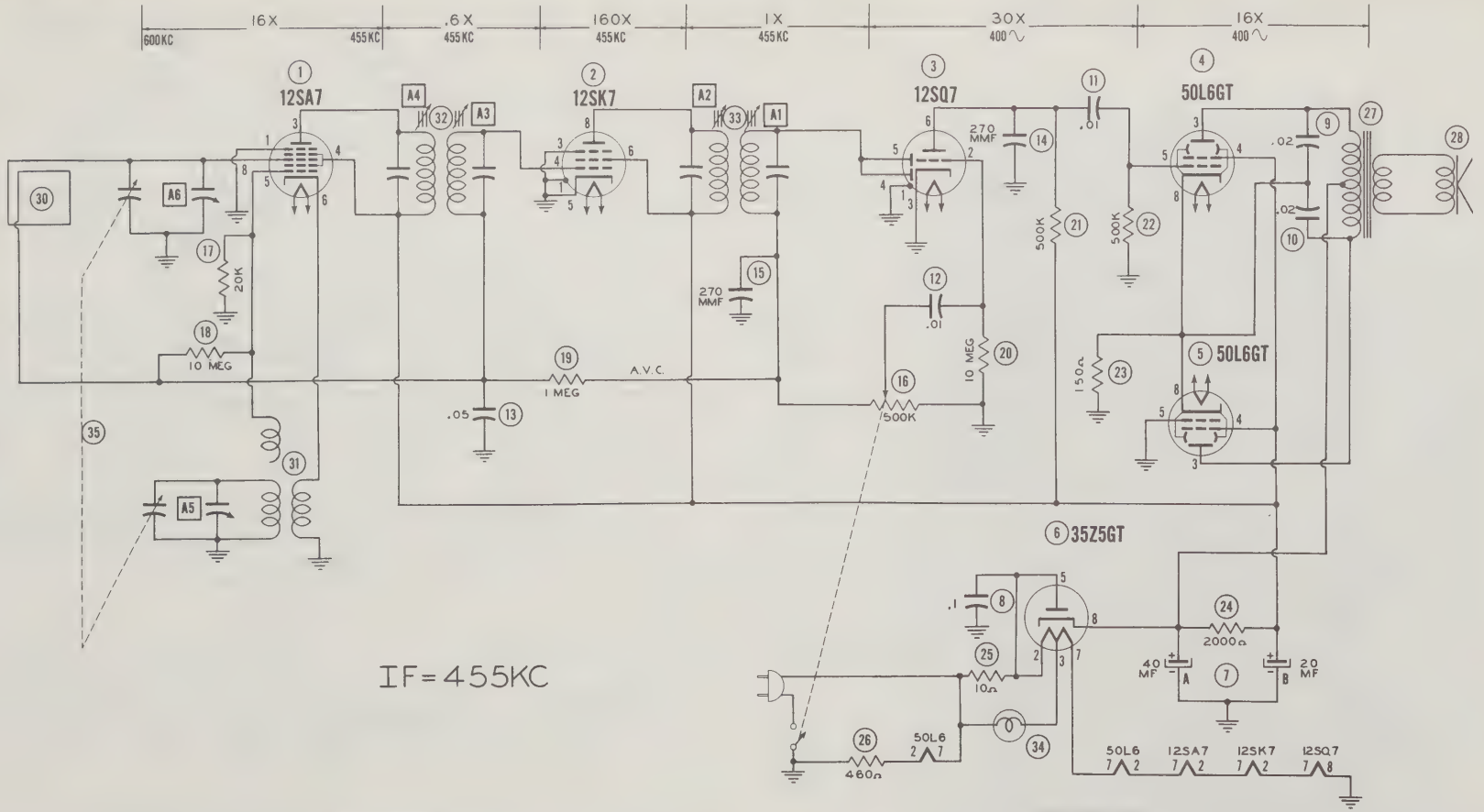


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



GENERAL TELEVISION MODEL 986P



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	23VAC	80VDC	80VDC	-12VDC§	0V.	36VAC	-.6VDC
2	12SK7GT	0V.	11VAC	0V.	-.6VDC	0V.	80VDC	23VAC	80VDC
3	12SQ7GT	0V.	-.5VDC	0V.	-.5VDC	-.5VDC	57VDC	11VAC	0V.
4	50L6GT	0V.	67VAC	125VDC	80VDC	0V.	0V.	117VAC	7.3VDC
5	50L6GT	0V.	36VAC	125VDC	80VDC	0V.	0V.	90VAC	7.3VDC
6	35Z5GT	0V.	115VAC	114VAC	0V.	115VAC	117VAC	80VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	24Ω	160KΩ	160KΩ	20KΩ	.9Ω	35Ω	1.5 Meg.
2	12SK7GT	0Ω	12Ω	0Ω	1.5 Meg.	0Ω	160KΩ	24Ω	160KΩ
3	12SQ7GT	0Ω	10 Meg.	0Ω	500KΩ	500KΩ	660KΩ	12Ω	0Ω
4	50L6GT	0Ω	120Ω	160KΩ	160KΩ	500KΩ	INF.	95Ω	150Ω
5	50L6GT	0Ω	35Ω	160KΩ	160KΩ	0Ω	INF.	78Ω	150Ω
6	35Z5GT	INF.	100Ω	95Ω	0Ω	100Ω	95Ω	78Ω	160KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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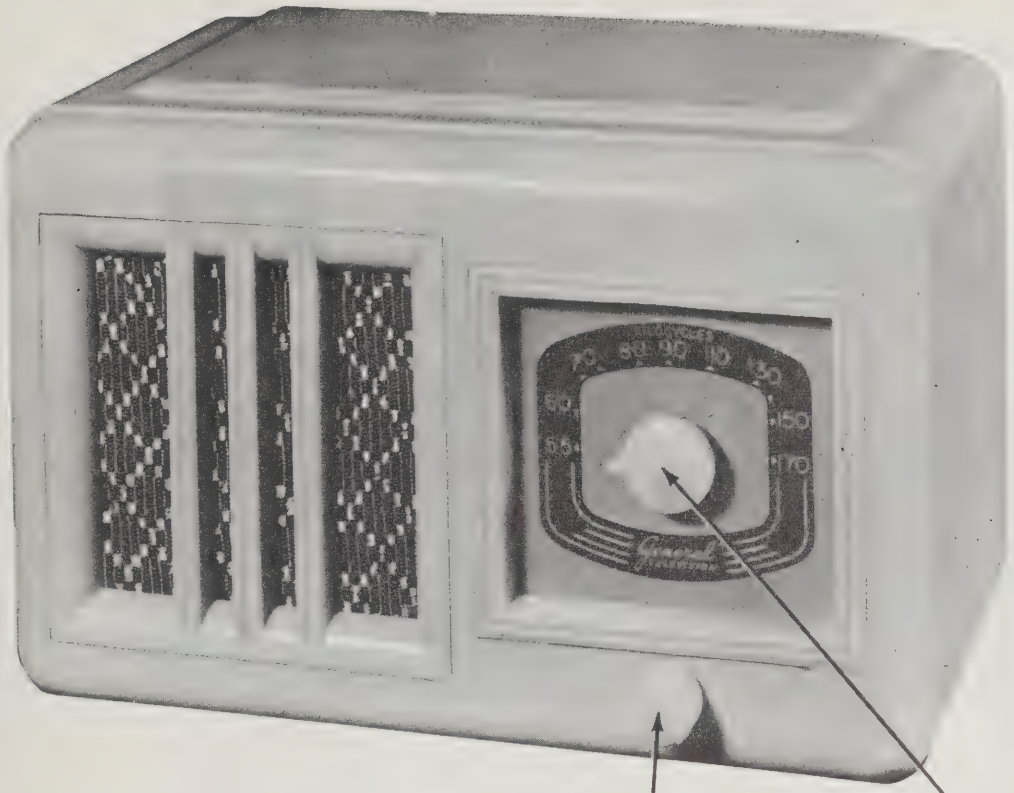
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

GENERAL TELEVISION
MODEL 27C5



GENERAL TELEVISION
MODEL 27C5

GENERAL TELEVISION MODEL 27C5

TRADE NAME	General Television, Model 27C5
MANUFACTURER	General Television & Radio Corp., 2701 Lehmann St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 14Q7 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 Power Output, 35Y4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1600KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A4	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

GENERAL TELEVISION
MODEL 27C5

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GEN. TELE. PART No.	STANDARD REPLACEMENT		
1	Converter	14Q7	14Q7	8AL	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GEN. TELE. PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
6A	40	150	3-3	DSB-3x20-150*	TA-240	PRSA150-20-40	EDL4215	Filter-Red
B	20	150						" -Blue
7	.1	600		MPH-6-1	TC-1	684-.1	DT6P1	Line Filter
8	.02	400		S-4-02	TC-12	484-02	DT4S2	Output Plate Bypass
9	.01	200		S-4-01	TC-11	484-01	DT2S1	Audio Coupling
10	.01	200		S-4-01	TC-11	484-01	DT2S1	" "
11	.05	600		S-6-05	TC-15	684-05	DT6S5	AVC Filter
12	250	500		MO.5-325	1FM-325	1468-00025	5W5T25	AF Plate Bypass
13	250	500		MO.5-325	1FM-325	1468-00025	5W5T25	IF Coupling
14	250	500		MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
15	100	500		MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.

*Parallel two sections to obtain desired capacity.

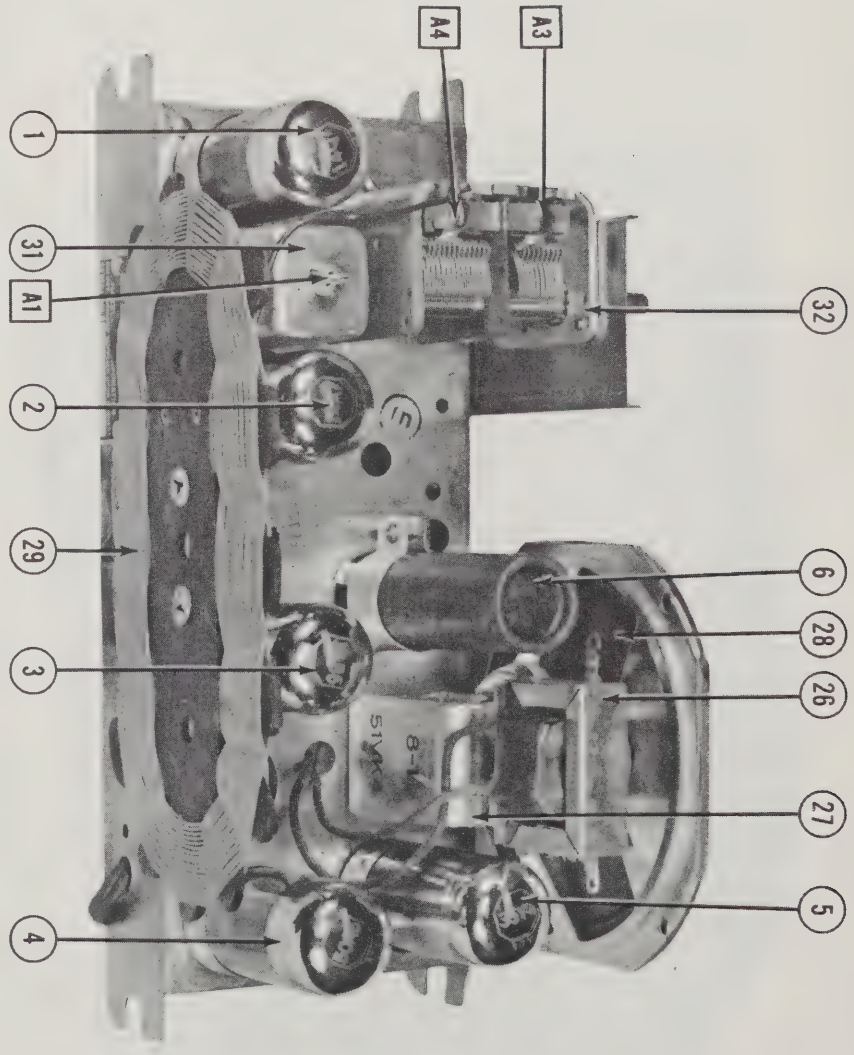
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GEN. TELE. PART No.	IRC PART No.	CLAROSTAT PART No.	
16A	500KΩ	½	20-1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GEN. TELE. PART No.	IRC PART No.	
17	7KΩ	½		BTS-6800	V1.-Blk.-Red Oscillator Grid
18	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
19	6800Ω	½		BTS-6800	Blue-Gray-Red IF Plate Load
20	47KΩ	½		BTS-47K	Y1.-V1.-Or. Diode Filter
21	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
22	500KΩ	½		BTS-470K	Grn.-Blk.-Y1. AF Plate Load
23	1.2 Meg.	½		BTS-1.2 Meg.	Br.-Red-Grn. Output Grid
24	150Ω	½		BW-2-150	Br.-Grn.-Br. Output Cathode
25	2000Ω	1		BTA-2200	Red-Blk.-Red Filter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GEN. TELE.	STANCOR	THORDAR'N	MERIT	
	PRI.	SEC.	PRI.	SEC.	PART No.	PART No.	PART No.	PART No.	
26	2100Ω	3.0Ω	170Ω	.5Ω		A-3876‡	T22S45‡	A-2928‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GEN. TELE. PART No.	JENSEN PART No.	QUAM PART No.	
27	FIELD PM	VC IMP. 3.0Ω	8-1	ST-107# Mod. P5-V	5A15†	#Drill and tap magnet frame. †Drill new mounting holes.
28	CONE DIA. 4½"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

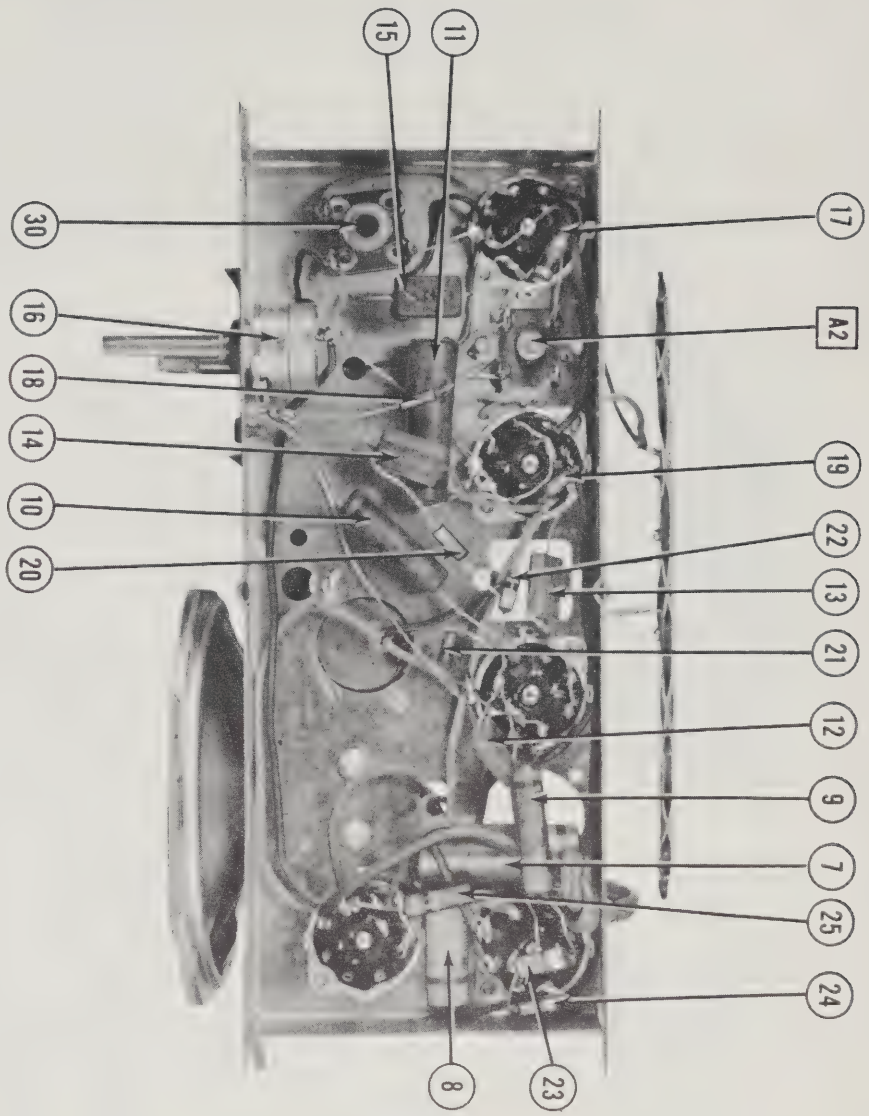
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	GEN. TELE. PART No.	MEISSNER PART No.
29	Loop Ant.		1.1Ω	13-2	
30	Osc. Coil	.9Ω	5.4Ω	14-3	14-1060
31	Input IF	21Ω	21Ω	15-4	16-6666

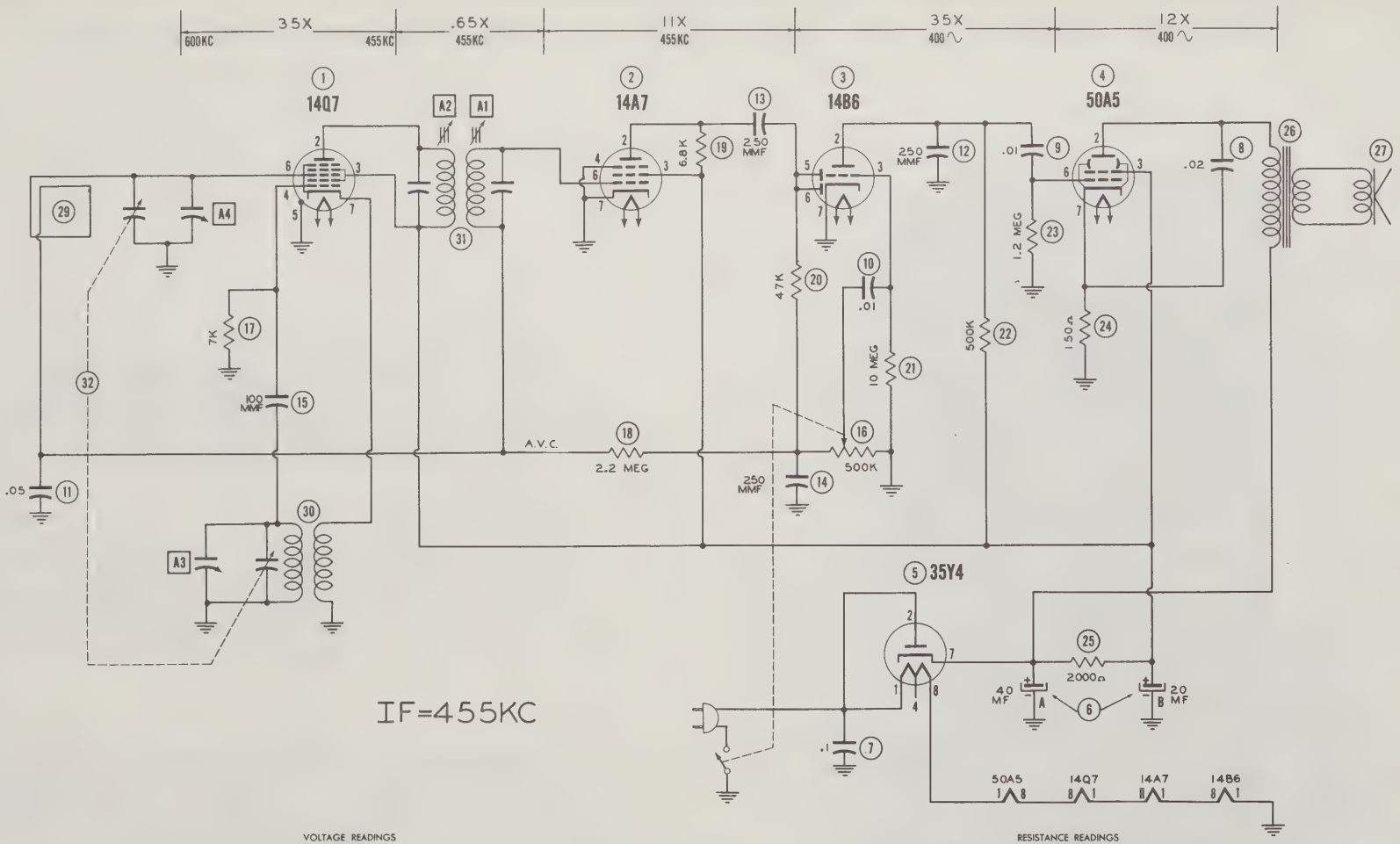
MISCELLANEOUS

ITEM No.	PART NAME	GEN. TELE. PART No.	NOTES
32	2 Gang Var. Cap.	6-4	(23-475MMF, 28-195MMF)

CHASSIS—BOTTOM VIEW



GENERAL TELEVISION MODEL 27C5



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	24VAC	85VDC	85VDC	-4VDC§	0V.	-1.2VDC	0V.	36VAC
2	14A7	12VAC	30VDC	85VDC	0V.	0V.	-1.2VDC	0V.	24VAC
3	14B6	0V.	52VDC	-.6VDC	0V.	-.8VDC	-.8VDC	0V.	12VAC
4	50A5	85VAC	125VDC	85VDC	0V.	0V.	0V.	6VDC	36VAC
5	35Y4	117VAC	117VAC	0V.	112VAC	0V.	0V.	130VDC	85VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	24Ω	300KΩ	300KΩ	7KΩ	0Ω	2.5 Meg.	1.1Ω	37Ω
2	14A7	13Ω	310KΩ	300KΩ	0Ω	0Ω	2.5 Meg.	0Ω	24Ω
3	14B6	0Ω	800KΩ	10 Meg.	0Ω	550KΩ	550KΩ	0Ω	13Ω
4	50A5	90Ω	300KΩ	300KΩ	0Ω	INF.	INF.	140Ω	37Ω
5	35Y4	125Ω	125Ω	INF.	115Ω	INF.	0Ω	300KΩ	90Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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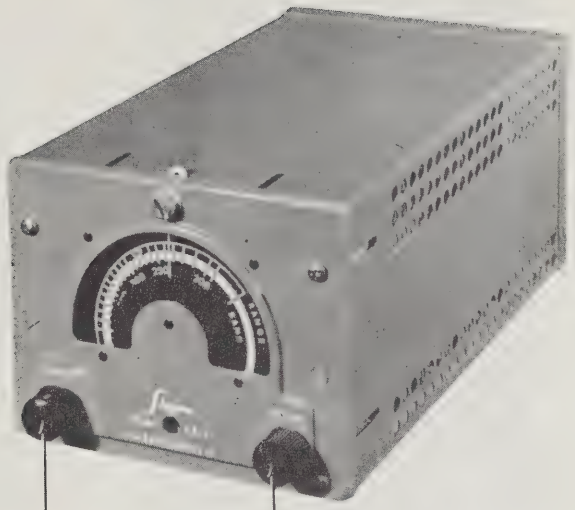
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

HALLICRAFTERS
MODEL CA-4



HALLICRAFTERS
MODEL CA-4

HALLICRAFTERS MODEL CA-4

TRADE NAME	Hallicrafters, Model CA-4
MANUFACTURER	Hallicrafters Co., 2611 S. Indiana Ave., Chicago, Ill.
TYPE SET	Battery Operated Aircraft Crystal Controlled Transmitter and Superheterodyne Rec.
TUBES (SEVEN)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 6J5 Crystal Osc., 6V6GT Power Output, 6V6GT Final RF Amp., 6X5GT Rectifier.
POWER SUPPLY	12 Volts Storage Battery
RATING	3.5 Amp. @ 13.5 Volts DC (Rec), 5.4 Amp. @ 13 Volts DC (Trans.)
TUNING RANGE	195-410KC TRANSMITTER FREQ. 2-7MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed. Dial indicator should set over 1st mark after 200 reference mark. If it does not loosen set screw on dial drum and reposition dial.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) 12BE6. Low side to chassis.	455KC	300KC	Across terminals 1 & 5 of power plug.	A1,A2, A3,A4.	Adjust for maximum output in order given and repeat.
2	100MMFD & 51MMFD	Connect 51MMFD cap. from ant. socket to chassis. High side of sig. gen. in series with 100MMFD to ant. recept. Low side to chassis.	220KC	220KC	"	A5	Adjust for maximum output.
3	"	"	380KC	380KC	"	A6	Adjust for maximum output. Repeat Steps 2 & 3 until no further improvement can be made.
4	"	"	220KC	Tune for maximum output.	"	A7	Adjust for maximum output.
5	"	"	380KC	"	"	A8	" " " "
6	"	"	1260KC	350KC	"	Ant. Coil(65)	Twist or untwist gimmick on ant. coil for minimum image signal.

TRANSMITTER ADJUSTMENT

After transceiver has been installed in plane connect 0-1 RF ammeter in series with antenna and antenna load coil. Adjust inductance of load coil for maximum current. (Approximately .7 Amp.) Whistling or talking into mike should cause an increase of approximately 20% in antenna current. Do not hold the press-to-talk button down for more than 10 seconds at a time until all tuning adjustments are completed.

NOTE: FCC regulations require that any tuning or adjustments that are apt to change the freq. or character of the signal transmitted must be made by, or supervised by persons holding a second class telephone license, or better.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: HALLICRAFTERS PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Crystal Osc.	6J5	6J5	6Q	
5	Power Output	6V6GT	6V6GT	7AC	
6	Final RF Amp.	6V6GT	6V6GT	7AC	
7	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

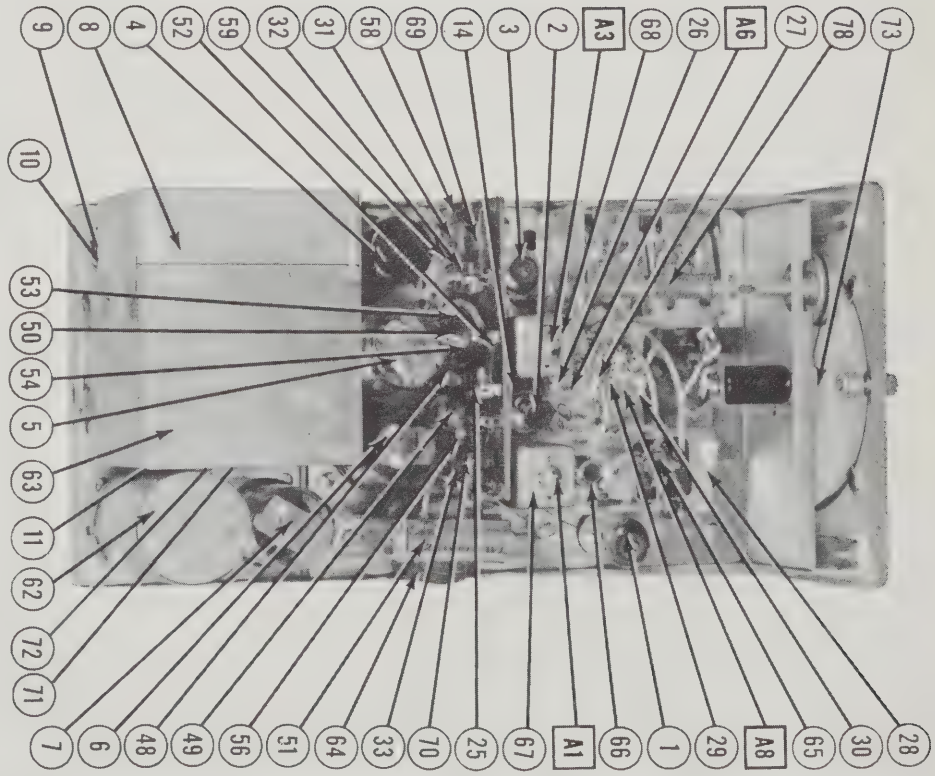
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HALLI. PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	8	450	45B104		PRSA450/8-3	BRD1145	M-2x8-450	Filter-Red
B	8	450			PRSA150/20-20	BRD2215		" "
C	20	150			PRS15/500	BRH155	M-2x20-150	Cathode Bypass-Yl.
D	20	150						" " "
E	500	15					M-500-15	Hash Filter
9	.02	1600	46A098-1					Buffer
10	.02	1600	46A098-1					"
11	.25	150	46A099-6					Hash Filter
12	.01	150	46A099-2	TC-11	484-01	DT2S1	S-4-01	" "
13	.05	150	46A099-3					" "
14	.002	600	46A100-2	TC-22	684-002	DT6D2	S-6-002	Audio Coupling
15	.001	150	46A099-5	TC-21	484-001	DT6D1	S-6-001	" "
16	.0005	600	46A100-3	1FM-35	1468-0005	5W5T5	M0.5-35	Diode RF Filter
17	.0001	600	46A100-2	1FM-31	1468-0001	5W5T1	M0.5-31	" " "
18	.25	200	46A099-6					Mic. Coupling
19	.1	150	46A099-4			DT2P1	S-2-1	RF Bypass Pwr. Supply
20	.1	150	46A099-4			DT2P1	S-2-1	IF Cathode Bypass
21	.01	150	46A099-2	TC-11	484-01	DT2S1	S-4-01	AVC Filter
22	.01	150	46A099-2	TC-11	484-01	DT2S1	S-4-01	Cony. Screen Bypass
23	.01	150	46A099-2	TC-11	484-01	DT2S1	S-4-01	Cathode Bypass
24	.02	600	46AY203J	TC-12	684-02	DT6S2	S-6-02	Output Plate Bypass
25	470	500	CM20A471M	1FM-35	1468-0005	5W5T5	M0.5-35	AF Plate Bypass
26	120	500	CC30UK121J					Fixed Trimmer-Cer.
27	15	500						" " - "
28	270	500	CC40TK271G					Fixed Pad - "
29	75	500	CC25UK750J					Fixed Trimmer- "
30	15	500						" " - "
31	47	500	CM20A470M					Crystal Osc. Grid Cap.
32	100	500	CM20A101M	1FM-31	1468-0001	5W5T1	M0.5-31	Osc. Coupling-Cer.
33	220	500	CC36UK221K					RF Coupling
34	5	500	CM20A050M	MS-55	1468-000005	5W5V5	M0.5-55	Neon Ind. Coupling-Cer.
35	220	500	CC36UK221K					Ant. Loading
36	.05	150	46A099-3					Hash Filter-See Note

Note-Not used in all models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: HALLICRAFT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
37A	50K2	±	25A566	D14-123	M-44-S	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 36A per instructions
C	Switch		" "	41	SW-A	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA HALLICRAFT. PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
38	1 Meg.	½	RC20AE105M	BTS-1500	Br.-Grn.-Red Parasitic Suppressor-See Note
39	1.5MΩ	½	RC20AE155M	BTS-1500	Br.-Grn.-Red " " " "
40	22KΩ	½	RC20AE223M	BTS-22K	Red-Red-Or. Oscillator Grid
41	4700Ω	½	RC20AE472M	BTS-4700	Yl.-Vi.-Red Converter Screen Decoupling
42	2.2 Meg.	½	RC20AE225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
43	68Ω	½	RC20AE680M	BW-½-68	Blue-Gray-Blk. IF Cathode
44	100KΩ	½	RC20AE104M	BTS-100K	Br.-Blk.-Yl. Bias Bleeder
45	47KΩ	½	RC20AE473M	BTS-47K	Yl.-Vi.-Or. Diode Filter
46	1000Ω	½	RC20AE102M	BTS-1000	Br.-Blk.-Red AF Cathode
47	10 Meg.	½	RC20AE106M	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
48	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
49	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. Output Grid
50	470Ω	½	RC20AE471M	BTS-470	Yl.-Vi.-Br. Mic. Load
51	3900Ω	10	24BG392E	AB-4000	Output Cathode
52	15Ω	½	RC20AE150M	BW-½-15	Br.-Grn.-Blk. Output Cathode
53	100Ω	1	RC30AE101M	BW-1-100	Br.-Blk.-Br. " "
54	220Ω	1	RC30AE221M	BW-1-220	Red-Red-Br. Output Cathode
55	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Br.-Blk.-Grn. Diode Load
56	2200Ω	½	RC20AE222M	BTS-2200	Red-Red-Red Filter
57	75Ω	½	RC20AE750M	BW-½-68	Yl.-Grn.-Blk. Mic. Load-See Note
58	47KΩ	½	RC20AE473M	BTS-47K	Yl.-Vi.-Or. Crystal Oscillator Grid
59	10KΩ	½	RC20AE103M	BTS-10K	Br.-Blk.-Or. Power Amplifier Grid
60	39Ω	2	RC40AE390K	BW-2-39	Or.-White-Blk. Series Pilot Light
61	150Ω	½	RC20AE151M	BW-½-150	Br.-Grn.-Br. Hash Suppression-See Note

Note-Not used in early production.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA HALLICRAFTERS PART No.	REPLACEMENT DATA RADIART PART No.	INSTALLATION NOTES
62	Interrupter	12	180~	27A139	5517-12	

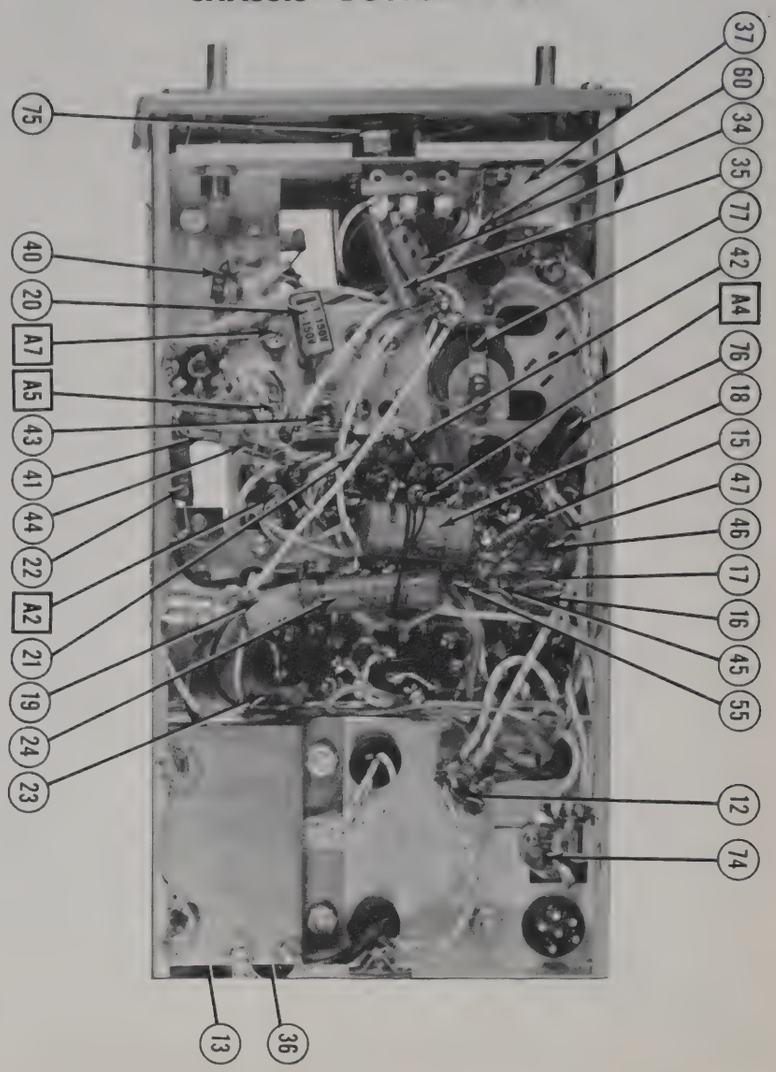
TRANSFORMER (VIBRATOR)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA HALLICRAFTERS PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.
63	12VDC @ 3.5A	560V CT @ .106A			52C126			

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA HALLICRAFT. PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
64	4200Ω	3.2Ω	170Ω	.6Ω	55A075				
	TURNS RATIO PRI. TO SEC. 15 to 1			1.3Ω					

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

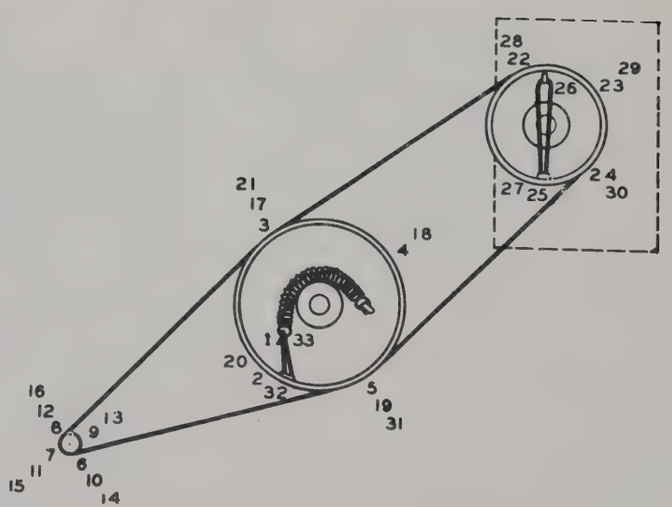
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA HALLICRAFTER PART No.	REPLACEMENT DATA MEISSNER PART No.	
65	Ant. Coil	90Ω	16Ω	51B859		
66	Osc. Coil		8.5Ω	51B861		
67	Input IF	11Ω	11Ω	50B206		
68	Output IF	11Ω	11Ω	50B207		
69	Plate Choke		7Ω	53A101		
70	" "		7Ω	53A101		
71	Hash Choke*			53A100		*Enclosed in power assembly.
72	" " *			53A100		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA HALLICRAFTER PART No.		INSTALLATION NOTES
73	Bayonet	6-8	0.25	Blue			Type 44

MISCELLANEOUS

ITEM No.	PART NAME	HALLICRAFTERS PART No.	NOTES
74	Spark Plate	46B103	
75	Indicator	39A012	Neon
76	Crystal	19A1210	
77	Relay	21B075	
78	2 Gang Var. Cap.	48C172	(14-543MMF) each section
A6	Trimmer	44A103	Osc. Adj.
A8	"	44A222	Ant. Adj.
	Knob	15A074-1	
	Dial Scale	63C285	
	Dial Window	22B171	



Cut a 30" length of 12 lb. test dial cord and tie one end of the tension spring on the pulley mounted on the hub of the bandswitch at position "1" on the diagram. Follow the numbers from "1" to "33", stretch the tension spring and tie cord securely. Cut off excess cord.

Dial cable stringing procedure.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BE6	-7.5VDC§	0V.	13.5VDC	0V.	105VDC	75VDC	0V.	-
2	12BA6	0V.	0V.	13.5VDC	0V.	105VDC	105VDC	1VDC	-
3	12AT6	0V.	.7VDC	13.5VDC	0V.	0V.	0V.	80VDC	-
** 4	6J5	0V.	6.5VDC	265VDC	0V.	-20VDC§	0V.	13.5VDC	13VDC
5A	6V6GT	0V.	6.5VDC	400VDC	410VDC	80VDC	115VDC	0V.	125VDC
** 5B	6V6GT	0V.	6.5VDC	235VDC	250VDC	10VDC	20VDC	0V.	25VDC
** 6	6V6GT	0V.	0V.	235VDC	235VDC	-11.5VDC	0V.	6.5VDC	13VDC
7	6X5GT	0V.	6.5VDC	340VAC	0V.	340VAC	0V.	13.5VDC	410VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BE6	23KΩ	.5Ω	1.5Ω	0Ω	3.5KΩ	3.2KΩ	1.5KΩ	-
2	12BA6	3.5 Meg.	0Ω	1.5Ω	0Ω	3.5KΩ	3.5KΩ	68Ω	-
3	12AT6	10 Meg.	1KΩ	1.5Ω	0Ω	1 Meg.	0Ω	570KΩ	-
** 4	6J5	0Ω	1Ω	100KΩ	INF.	47KΩ	INF.	1.5Ω	3.5KΩ
5A	6V6GT	0Ω	1Ω	100KΩ	102KΩ	470KΩ	3.8KΩ	0Ω	4KΩ
** 5B	6V6GT	0Ω	1Ω	100KΩ	102KΩ	470KΩ	300Ω	0Ω	400Ω
** 6	6V6GT	0Ω	0Ω	100KΩ	100KΩ	10KΩ	1Ω	1Ω	100Ω
7	6X5GT	0Ω	1Ω	100Ω	INF.	90Ω	INF.	1.5Ω	100KΩ

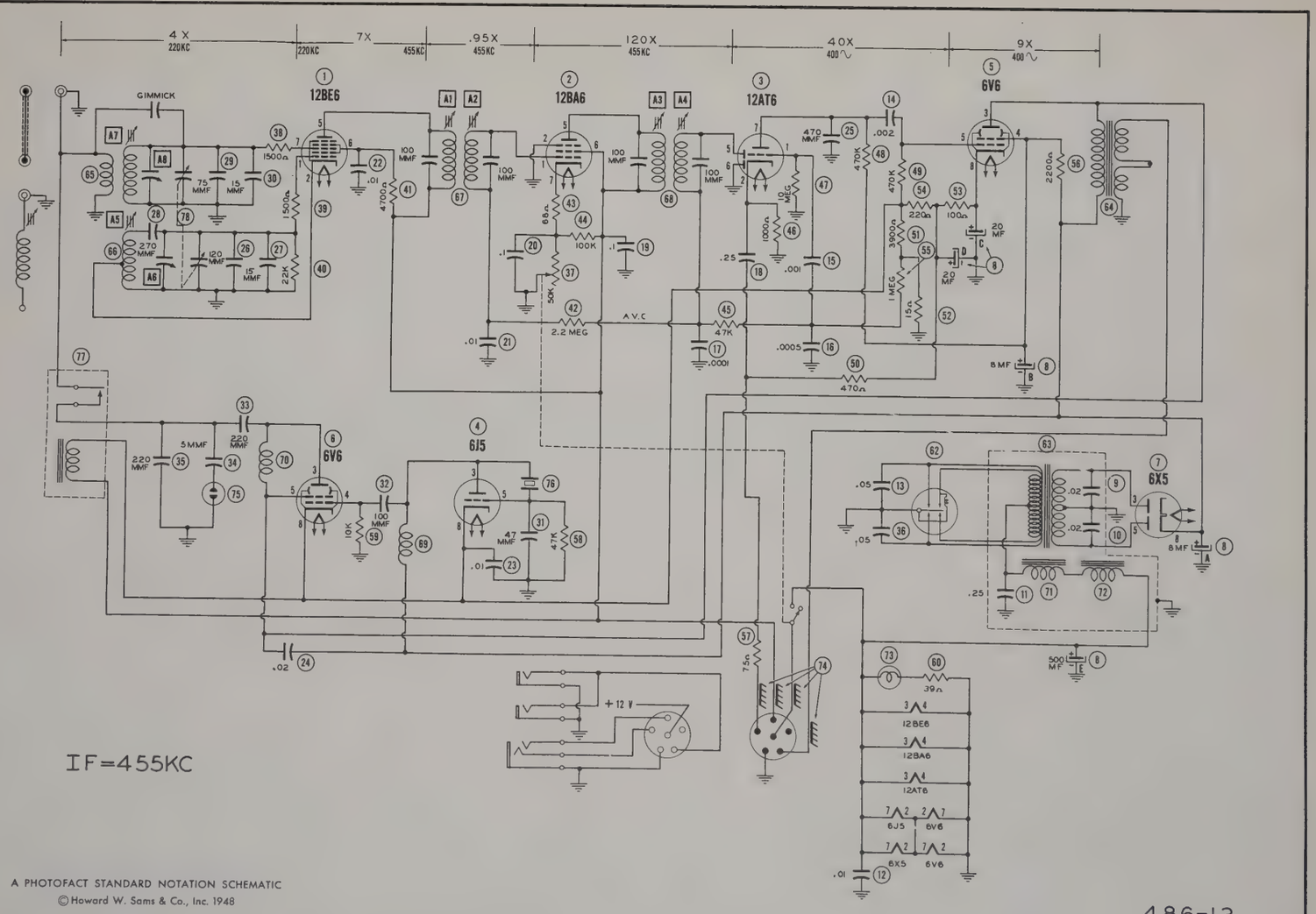
§TAKEN WITH VACUUM TUBE VOLTMETER.

** TAKEN WITH RELAY CLOSED.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 13.7 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

DATE 3/48-#486-13 SET #36-FOLDER #13



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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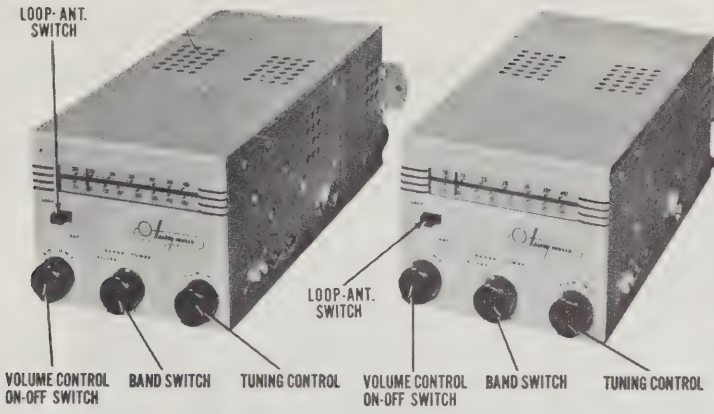
486-13

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

HARVEY-WELLS MODELS
ATR-3-6, ATR-3-12



MODEL ATR-3-6 MODEL ATR-3-12

TRADE NAME	Harvey-Wells, Models ATR-3-6, ATR-3-12
MANUFACTURER	Harvey-Wells Electronics, Inc., Southbridge, Mass.
TYPE SET	Storage Battery Operated Aircraft Transceiver
TUBES (EIGHT)	Types, 7A7 Crystal Osc., 7C5 RF Power Amp., 7A7 Tuned RF Amp., 7Q7 Converter-Osc., 7R7 IF Amp.-Det., 7F7 AF-Filter-Inv., (2) 7C5 Output-Modulator
POWER SUPPLY	6 Volts Storage Battery (ATR-3-6), 12 Volt Storage Battery (ATR-3-12)
RATING	10 Amp. (Trans.) 7 Amp. (Rec.) @ 6 Volts DC, 5 Amp. (Trans) 3.5 Amp.(Rec) @ 12V DC
TUNING RANGE—BROADCAST	550-1600KC RANGE 195-405KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Cutput meter should have output impedance of approx. 200Ω.

Volume control should be at maximum position output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

In Step 6 the fixed frequency in tower position may be any frequency between 195 and 405KC to suit individual need.

After installation A7, A11 and A15 should be aligned on weak signals for maximum output (A15 on a signal approximately 1500KC, A11 approx. 390KC and A15 on 278KC.)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) 7Q7. Low side to chassis.	142.5KC	BC	1500KC	Across head phone jack.	A1,A2, A3,A4.	Adjust for maximum output
2	90MMFD.	High side to ant. plug. Low side to chassis.	1500KC	"	"	"	A5,A6, A7	Adjust for maximum output in order given.
3	90MMFD.	"	600KC	"	600KC	"	A8	Adjust for maximum output Repeat Steps 2 & 3 until no further improvement can be made.
4	90MMFD.	"	390KC	Range	390KC	"	A9,A10, A11	Adjust for maximum output in order given.
5	90MMFD.	"	210KC	"	210KC	"	A12	Adjust for maximum output Repeat Steps 4 & 5 until no further improvement can be made.
6	90MMFD.	"	278KC	Tower	278KC	"	A13,A14 A15	Adjust in order given for maximum output.

TRANSMITTER ADJUSTMENT

1. Insert RF meter in series with lead from antenna to the antenna load coil.
2. Connect RF meter lead to tap "1" of the load coil. Turn on transmitter (without modulation) and adjust iron core in antenna load coil for maximum current. Repeat this with remaining taps until absolute maximum current is obtained.
3. With transceiver turned off move tap on transmitter coil down one tap (as viewed from top of receiver), turn transmitter on (without modulation) and repeat Step 2 for maximum current reading.
4. Repeat Step 3 then 2 until absolute maximum antenna current is obtained.
5. Optimum loading condition is reached with maximum antenna current without modulation and giving an increase of approximately 20% in antenna current with modulation.
6. If a decrease in antenna current is observed with modulation, back up one tap at a time on transmitter tank coil. Repeat Step 2 then check with modulation. Repeat Steps 6 & 2 until antenna current increases 20% with modulation.
7. If ship is equipped with trailing antenna connect an RF meter in series with antenna lead. Reel out antenna in flight for maximum current. Note the length then cut the antenna to this length. (Approximately 72 feet). Then it will only be necessary to reel out full length of antenna for optimum operation.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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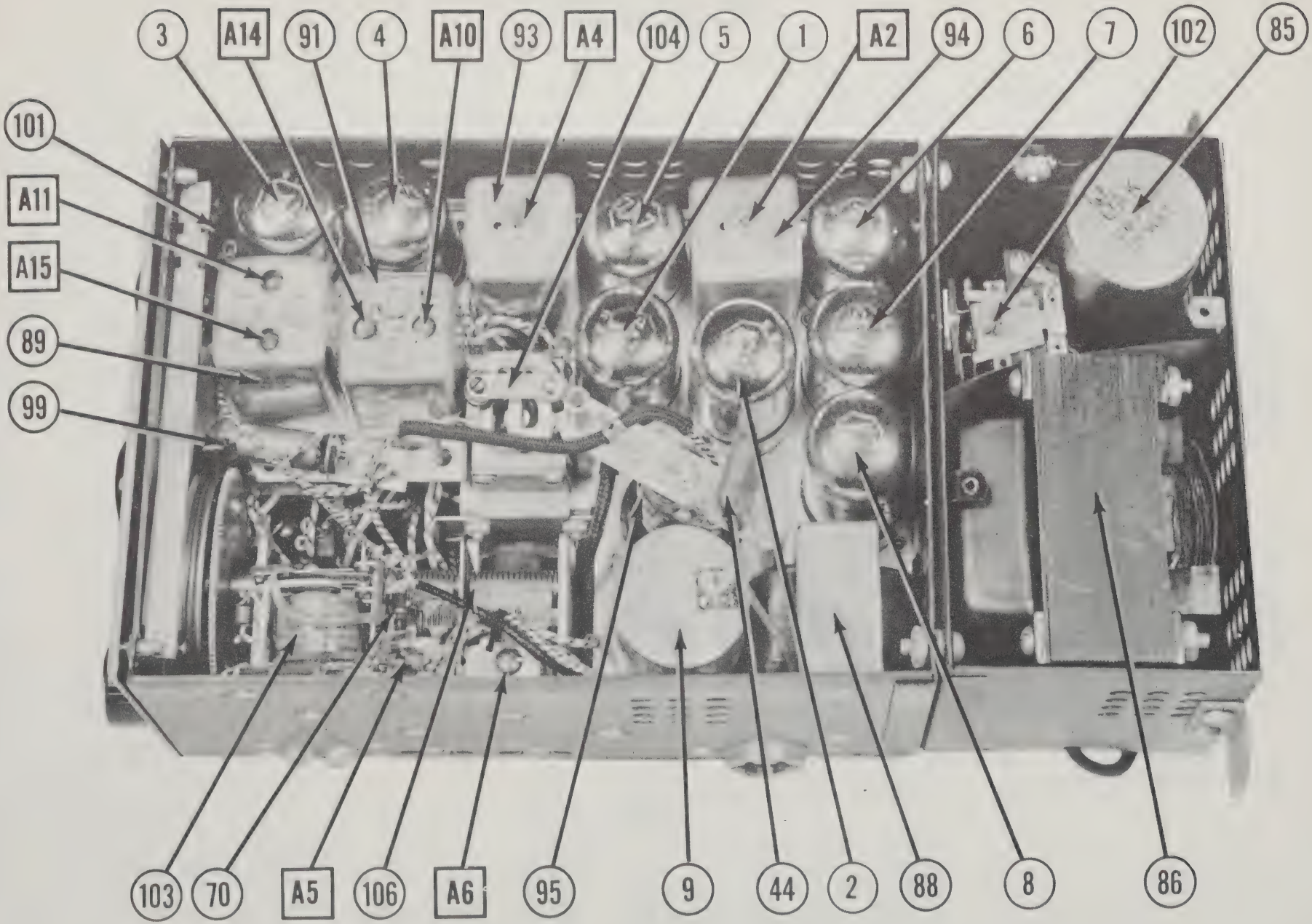
3
A14
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A2
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A15
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A7
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A13
A9
A12
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A8
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69

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: HARVEY-WELLS PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Crystal Osc.	7A7	7A7	8V	
2	RF Power Amp.	7C5	7C5	6AA	
3	Tuned RF Amp.	7A7	7A7	8V	
4	Converter-Osc.	7Q7	7Q7	8AL	
5	IF Amp.-Det.	7R7	7R7	8AE	
6	AF-Filter-Inv.	7F7	7F7	8AC	
7	Output-Modulator	7C5	7C5	6AA	
8	Output-Modulator	7C5	7C5	6AA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HARVEY-WELLS PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	450	1P3050-20		AJ444J		DY-3x20-450	◓ Filter
B	20	450						◙ " "
C	10	350						▲ "
D	10	50			PRS50-10		M-10-50	Output Cathode Bypass
10	25	25	1N1002-25RC	TA-25	PRS-25-25	BR252A	M-25-25	Mic. Supply Bypass
11	.01	600	1C3004-14PM	TC-11	684-01	DT6S1	S-6-01	Audio Coupling
12	.01	600	1C3004-14PM	TC-11	684-01	DT6S1	S-6-01	" "
13	.004	600	1C3003-43PM	TC-24	684-004	DT6D4	S-6-004	" "
14	.004	600	1C3003-43PM	TC-24	684-004	DT6D4	S-6-004	" "
15	.01	400	1C3003-14K					Range Filter Cap. ±10%
16	.05	100	1C2004-54PM	TC-15	484-05	DT4S5	S-4-05	IF Cathode Bypass
17	.05	400	1C3005-54PM	TC-15	484-05	DT4S5	S-4-05	RF Amp. Decoupling
18	.25	200	1C2001-QR25M	TC-2	484-25	DT4P25	S-4-25	RF Cathode Bypass
19	.004	600	1C3003-43PM	TC-24	684-004	DT6D4	S-6-004	Output Plate Bypass
20	.05	100	1C2004-54PM	TC-15	484-05	DT4S5	S-4-05	AVC Filter
21	1	120	1A2022-1R0M					Hash Filter
22	1	120	1A2022-1R0M					" "
23	.01	1600	1A4001-14SK	TR-11	1684-01	MD16S1	TM-16-01	Buffer
24	.1	600	1A3006-QR1M	TC-1	684-.1	DT6P1	S-6-1	Power Supply Bypass
25	250	500	1G3200-251M	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
26	250	500	1G3200-251M	1FM-325	1468-00025	5W5T25	MO.5-325	Diode Filter
27	250	500	1G3200-251M	1FM-325	1468-00025	5W5T25	MO.5-325	AVC Coupling
28	250	500	1G3200-251M	1FM-325	1468-00025	5W5T25	MO.5-325	Diode Filter
29	10		1K3001-3	MS-41	1469-00001	5R5Q1	MOS.5-41	RF Coupling-Cer.
30	250	500	1G3200-251M	1FM-325	1468-00025	5W5T25	MO.5-325	" "
31	10		1K3001-3	MS-41	1469-00001	5R5Q1	MOS.5-41	RF Coupling-Cer.-See Note
32	90	500	1J3002-91J					Ant. Coil Pri. Shunt-Sil.
33	350	500	1G3200-351J					Dummy Loop Fixed Trimmer
34	100	500	1G3200-12M	1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.
35	82		1K3003-820J					Fixed Trimmer Cer ± 5%
36	660	500	1J3001-66J					Fixed Padder-Silver
37	1600	500	1J3001-162J					Fixed Padder-Silver
38	800	800	1G4506-82M					Power Amp. Screen Bypass
39	250	500	1G3200-251J		1469-00025	5R5T25	MOS.5-325	Tank Fixed Trimmer ± 5%
40	2000	500	1G3201-23M	1FM-22	1467-002	1W5D2	MW.5-22	Power Amp. Cathode Bypass
41	400	500	1G3200-42M	1FM-34	1468-0004	5W5T4	MO.5-34	Osc. Coupling
42	1000	500	1G4505-13M	1FM-21	1468-001	1W5D1	MW.5-21	Crystal Osc. Screen Byp.
43	80	500	1J3002-81J					Crystal Osc. Grid Cap-Sil.
44	800	800	1G4506-82M					RF Bypass
45	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	Mic. RF Bypass
46	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	Speaker RF Bypass
47	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	Phono RF Bypass
48	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	Relay RF Bypass
49	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	" " "
50	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	A+ RF Bypass
51	500	500	1G3200-52M	1FM-35	1468-0005	5W5T5	MO.5-35	B+ " "

Note-Some models use 7MMF ceramic. Harvey-Wells part #1K3001-5.

PARTS LIST AND DESCRIPTIONS (Continued)

RANGE FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: HARVEY-WELLS PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
87		780Ω	2.3 Henries	12B1002-1				

TRANSFORMER (OUTPUT)

ITEM No.	RATING: TURNS RATIO	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: HARVEY-WELLS PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
88	Pri. to Mod. Sec. 1.3to 1	230Ω CT	150Ω	9D1003-1				
	Pri. to Ear-phone Sec. 6.5 to 1		16Ω					
	Pri. to Spkr. Sec. 50 to 1		.4Ω					

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: HARVEY-WELLS PART No.	REPLACEMENT DATA: MEISSNER PART No.	
89A	BC Ant.Coil	.5Ω	6Ω	10C1000-501		Items 89A & 89B in same can.
B	LF " "	90Ω	15Ω			
90	Dummy Loop Coil		1.5Ω	12E1001-1		
91A	BC RF Coil	105Ω	5Ω	10B1002-501		Items 91A & 91B in same can.
B	LF " "		22Ω			
92A	BC Osc.Coil	3Ω	9Ω	10H1000-501		Items 92A & 92B wound on same form.
B	LF " "		20Ω			
93	Input IF	21Ω	21Ω	10A1002-501		
94	Output IF	22Ω	22Ω	10A1002-502		
95	Tank Coil	0Ω	0Ω	12C1006-501		
96	Ant. Load Coil			13C1003-501		
97	RF Choke		0Ω	12A1000-1		
98	RF Choke		12Ω	12A11005-501		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: HARVEY-WELLS PART No.	REPLACEMENT DATA	INSTALLATION NOTES
99A	Bayonet	12-16	0.1		42A1000-1		Type 53 Used in ATR-3-12
B		6-8	0.2	White	42A1000-2		Type 51 Used in ATR-3-6

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	HARVEY-WELLS PART No.	IRC PART No.	CLAROSTAT PART No.	
52A	25KΩ	½	6C4000-E253M	D14-120		Sensitivity Control
B	Shaft		Not Req.	A		Attach to 52A per instructions " " " " "
C	Switch			41		

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	HARVEY-WELLS PART No.	IRC PART No.	
53	1 Meg.	½	5A3004-16M	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
54	39KΩ	1	5A4003-393K	BTA-39K	Or.-White-Or. Bleeder
55	1000Ω	½	5A3004-13M	BTS-1000	Br.-Blk.-Red IF Cathode
56	22KΩ	½	5A3004-223K	BTS-22K	Red-Red-Or. Oscillator Grid
57	220Ω	½	5A3002-221M	BW-½-220	Red-Red-Br. IF Cathode
58	1 Meg.	½	5A3004-16M	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
59	1 Meg.	½	5A3004-16M	BTS-1 Meg.	Br.-Blk.-Grn. AVC Diode Load
60	11KΩ	5	5F6000-5	AB-11K	Voltage Dropping
61	10 Meg.	½	5A3004-17M	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
62	220KΩ	½	5A3004-224M	BTS-220K	Red-Red-Yl. AF Plate Load
63	56KΩ	½	5A3004-563M	BTS-56K	Grn.-Blue-Or. Phase Inverter Cathode
64	560KΩ	½	5A3004-564M	BTS-560K	Grn.-Blue-Yl. Phase Inverter Grid
65	56KΩ	½	5A3004-563M	BTS-56K	Grn.-Blue-Or. Phase Inverter Plate Load
66	560KΩ	½	5A3004-564M	BTS-560K	Grn.-Blue-Yl. Output Grid
67	560KΩ	½	5A3004-564M	BTS-560K	Grn.-Blue-Yl. " "
68	470Ω	2	5K6000-471K	BW-2-470	Yl.-Vi.-Br. Output Cathode
69	10KΩ	1	5A4003-14M	BTA-10K	Br.-Blk.-Or. Output Screen Dropping
70	5100Ω	½	5A3004-512M	BTS-4700	Grn.-Br.-Red Audio Output Limiting
71	40Ω	2	5K6000-41K	BW-2-39	Yl.-Blk.-Blk. Filament Shunt
72	2000Ω	½	5A3004-23M	BTS-2200	Red-Blk.-Red Mic. Bias Network
73	510Ω	½	5A3004-511M	BTS-470	Grn.-Br.-Br. Mic. Load
74	1000Ω	1	5A4003-13M	BTA-1000	Br.-Blk.-Red Earphone Shunt
75	680Ω	1	5A4003-681M	BTA-680	Blue-Gray-Br. Series Earphone
76	56KΩ	½	5A3004-563M	BTS-56K	Grn.-Blue-Or. Crystal Oscillator Grid
77	56KΩ	½	5A3004-563M	BTS-56K	Grn.-Blue-Or. Crystal Oscillator Screen Dropping
78	20KΩ	1	5A4003-24M	BTA-22K	Red-Blk.-Or. Crystal Oscillator Plate Load
79	22KΩ	½	5A3004-223K	BTS-22K	Red-Red-Or. Power Amplifier Grid
80	100Ω	1	5C4001-12M	BW-1-100	Br.-Blk.-Br. Power Amplifier Cathode
81	5100Ω	1	5A4003-512M	BTA-4700	Grn.-Br.-Red Power Amplifier Screen Dropping
82	4000Ω	10	5C7000-43K	AB-4K	Filter
83	10KΩ	½	5A3001-14K	BTS-10K	Hash Suppression
84	.1Ω		5Z6000-1		Voltage Dropping-See Note

Note-Used in Model ATR-3-12 only.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				HARVEY-WELLS PART No.	RADIART PART No.	
85A	Synchronous	6	100∿	45A1000-1		Used in Model ATR-3-6
B	"	12	100∿	45A1000-2		Used in Model ATR-3-12

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	HARVEY-WELLS PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
86A	6.3V DC @ 4.7A	600V CT @ .07A					T22R22#	
86B	12V DC @ 4.2A	800V CT @ .120A						

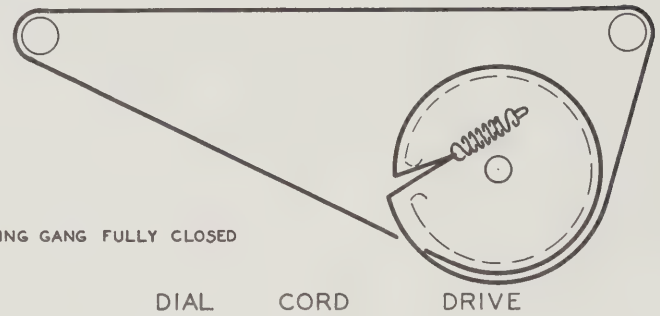
#Drill new mounting holes.
86A Used in Model ATR-3-6.
86B Used in Model ATR-3-12.

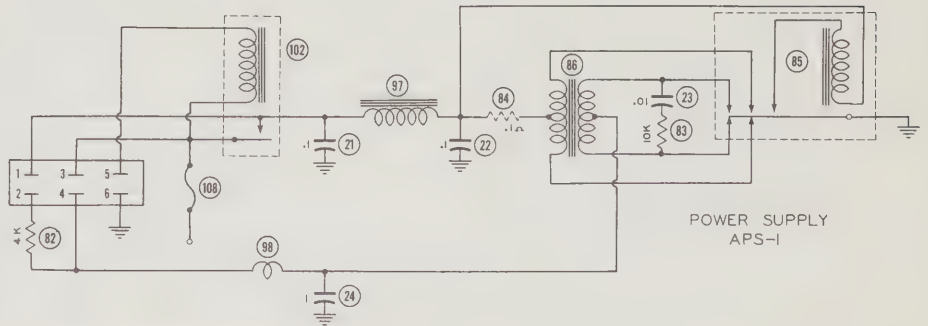
DATE 3/49-#486-14 SET #36-FOLDER #14

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	HARVEY-WELLS PART No.	NOTES
100	Switch	47F1009-1	Band
101	"	47L1000-1	Loop Ant.
102A	Relay	48A1009-2	APS-1-6
B	"	48A1009-1	APS-1-12
103A	"	48A1002-2	ATR-3-6
B	"	48A1002-1	ATR-3-12
104A	"	48A1008-2	ATR-3-6
B	"	48A1008-1	ATR-3-12
105	Crystal	70A1001-1	
106	3 Gang Var. Cap.	2B1003-1	(11-452MMF) each section)
107	Switch	47B1004-3	Fixed Ant.-Trailing Ant.
108A	Fuse	43A1001-15	APS-1-6
B	"	43A1001-10	APS-1-12
A8	Dual Trimmer	2A1004-1	BC Osc. Pad
A13			Tower Osc. Adj.
A9	" "	2A1004-3	Range Osc. Adj.
A12			Range Osc. Pad
A10	" "	2A1003-1	Range RF Adj.
A14			Tower RF Adj.
A11	" "	2A1003-1	Range Ant. Adj.
A15			Tower Ant. Adj.





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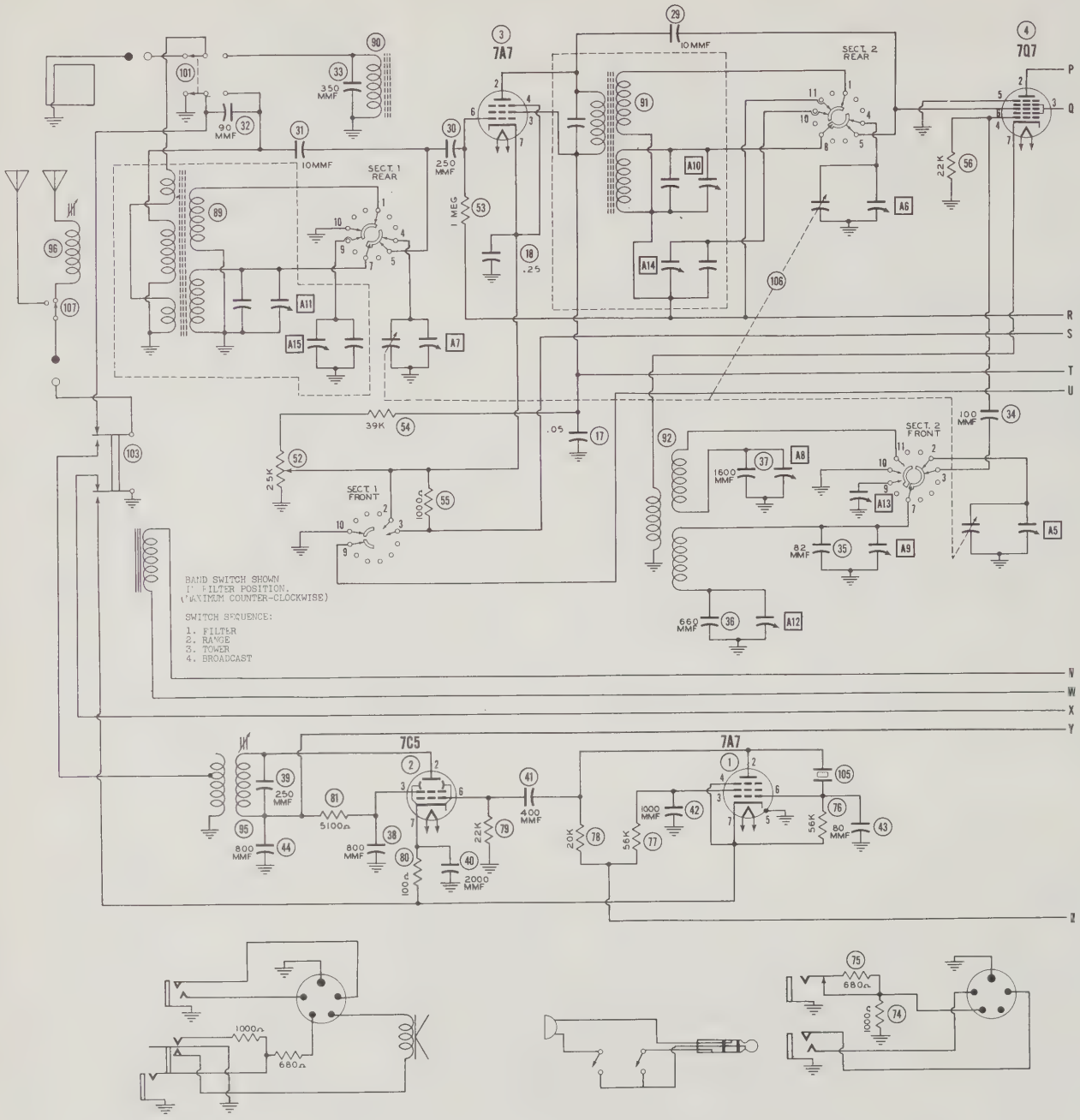

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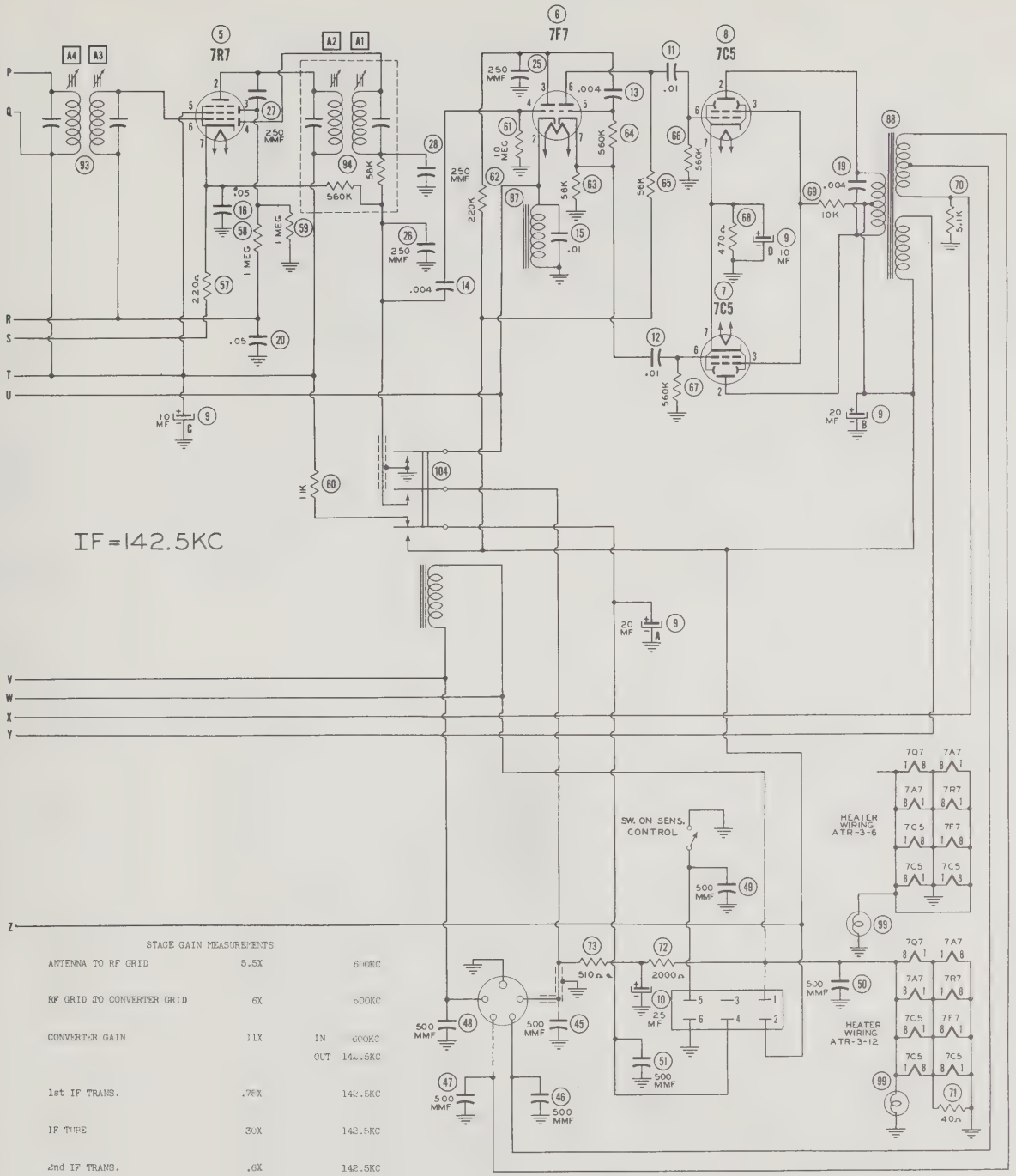

STAGE GAIN MEASUREMENTS

ANTENNA TO RF GRID	5.5X		600KC
RF GRID TO CONVERTER GRID	6X		600KC
CONVERTER GAIN	11X	IN	600KC
		OUT	142.5KC
1st IF TRANS.	.75X		142.5KC
IF TUBE	30X		142.5KC
2nd IF TRANS.	.6X		142.5KC
AUDIO	35X		400~
OUTPUT	15X		400~

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

ATR-3-6

#TAKEN WITH SEND RECEIVE RELAY IN SEND POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
#	1	7A7	0V.	107VDC	120VDC	0V.	0V.	0V.	0V.	6VDC
#	2	7C5	6VDC	220VDC	60VDC	63VDC	65VDC	-.3VDC	5.3VDC	0V.
	3	7A7	6VDC	76VDC	76VDC	0V.	0V.	-.4VDC	0V.	0V.
	4	7Q7	6VDC	76VDC	76VDC	-11VDC§	0V.	-.3VDC	0V.	0V.
	5	7R7	6VDC	76VDC	-.1VDC	.1VDC	76VDC	-.3VDC	.6VDC	0V.
	6	7F7	0V.	0V.	72VDC	-.4VDC	20VDC	152VDC	63VDC	6VDC
	7	7C5	0V.	210VDC	190VDC	0V.	210VDC	0V.	14VDC	6VDC
	8	7C5	0V.	210VDC	190VDC	0V.	210VDC	0V.	14VDC	6VDC

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
#	1	7A7	0Ω	80KΩ	120KΩ	0Ω	0Ω	56KΩ	0Ω	.3Ω
#	2	7C5	.3Ω	60KΩ	65KΩ	60KΩ	60KΩ	22KΩ	95Ω	0Ω
	3	7A7	.3Ω	50KΩ	50KΩ	1.5Ω	0Ω	3 Meg.	1.5Ω	0Ω
	4	7Q7	.3Ω	50KΩ	50KΩ	22KΩ	0Ω	2 Meg.	3Ω	0Ω
	5	7R7	.3Ω	50KΩ	1.1 Meg.	650KΩ	50KΩ	2 Meg.	220Ω	0Ω
	6	7F7	0Ω	0Ω	280KΩ	10 Meg.	600KΩ	120KΩ	60KΩ	.3Ω
	7	7C5	0Ω	60KΩ	70KΩ	INF.	60KΩ	500KΩ	450Ω	.3Ω
	8	7C5	0Ω	60KΩ	70KΩ	INF.	60KΩ	500KΩ	450Ω	.3Ω

§TAKEN WITH VACUUM TUBE VOLTMETER.

ATR-3-12

#TAKEN WITH SEND RECEIVE RELAY IN SEND POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
#	1	7A7	12VDC	107VDC	120VDC	0V.	0V.	0V.	0V.	6VDC
#	2	7C5	6VDC	220VDC	60VDC	63VDC	65VDC	-.3VDC	5.3VDC	12VDC
	3	7A7	6VDC	76VDC	76VDC	0V.	0V.	-.4VDC	0V.	0V.
	4	7Q7	6VDC	76VDC	76VDC	-11VDC§	0V.	-.3VDC	0V.	12VDC
	5	7R7	6VDC	76VDC	-.1VDC	.1VDC	76VDC	-.3VDC	.6VDC	0V.
	6	7F7	0V.	0V.	72VDC	-.4VDC	20VDC	152VDC	63VDC	6VDC
	7	7C5	0V.	210VDC	190VDC	0V.	210VDC	0V.	14VDC	6VDC
	8	7C5	12VDC	210VDC	190VDC	0V.	210VDC	0V.	14VDC	6VDC

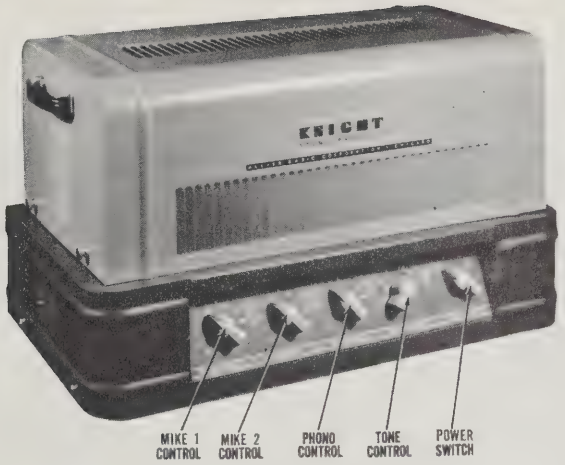
RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
#	1	7A7	1.2Ω	80KΩ	120KΩ	0Ω	0Ω	0Ω	0Ω	.6Ω
#	2	7C5	.6Ω	60KΩ	65KΩ	60KΩ	60KΩ	22KΩ	95Ω	1.2Ω
	3	7A7	.6Ω	50KΩ	50KΩ	1.5Ω	0Ω	3 Meg.	1.5Ω	0Ω
	4	7Q7	.6Ω	50KΩ	50KΩ	22KΩ	0Ω	2 Meg.	3Ω	1.2Ω
	5	7R7	.6Ω	50KΩ	1.1 Meg.	650KΩ	50KΩ	2 Meg.	220Ω	0Ω
	6	7F7	0Ω	0Ω	280KΩ	10 Meg.	600KΩ	120KΩ	60KΩ	.6Ω
	7	7C5	0Ω	60KΩ	70KΩ	INF.	60KΩ	500KΩ	450Ω	.6Ω
	8	7C5	1.2Ω	60KΩ	70KΩ	INF.	60KΩ	500KΩ	450Ω	.6Ω

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6 or 12 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Sensitivity control at maximum, no signal applied for voltage measurements.



KNIGHT MODEL 93-146

TRADE NAME	Knight, Model 93-146
SUPPLIER	Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (SEVEN)	Types, (2) 6SJ7 Mic. Pre-Amp., 6SC7 1st AF Amp., 6SC7 AF-Phase Inv., (2) 6L6G Power Output, 5U4G Rectifier.
POWER SUPPLY	110-125 Volts AC RATING 1.2 Amp. @ 117 Volts AC

**DO NOT MEASURE.
*MEASURE 6.3VAC BETWEEN FILAMENT PINS.
SET ON 117 VOLT TAP.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	25VDC*	0V.	**	0V.	23VDC	25VDC*	55VDC
2	6SJ7	0V.	25VDC*	0V.	**	0V.	23VDC	25VDC*	55VDC
3	6SC7	0V.	70VDC	0V.	0V.	70VDC	.8VDC	25VDC*	25VDC*
4	6SC7	0V.	200VDC	0V.	0V.	200VDC	2VDC	25VDC*	25VDC*
5	6L6G	0V.	25VDC*	440VDC	350VDC	0V.	0V.	25VDC*	25VDC
6	6L6G	0V.	25VDC*	440VDC	350VDC	0V.	0V.	25VDC	25VDC
7	5U4G	0V.	450VDC	0V.	435VAC	0V.	435VAC	0V.	450VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	250Ω	0Ω	**	0Ω	2.5 Meg.	250Ω	525KΩ
2	6SJ7	0Ω	250Ω	0Ω	**	0Ω	2.5 Meg.	250Ω	525KΩ
3	6SC7	0Ω	155KΩ	250KΩ	0Ω	155KΩ	650Ω	250Ω	250Ω
4	6SC7	0Ω	115KΩ	250KΩ	3.9KΩ	115KΩ	1KΩ	250Ω	250Ω
5	6L6G	0Ω	250Ω	6KΩ	5KΩ	100KΩ	INF.	250Ω	250Ω
6	6L6G	0Ω	250Ω	6KΩ	5KΩ	100KΩ	INF.	250Ω	250Ω
7	5U4G	INF.	6KΩ	INF.	80Ω	INF.	75Ω	INF.	6KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltate measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 3/48-#486-15 SET #36-FOLDER #15

PARTS LIST AND DESCRIPTIONS

KNIGHT MODEL 93-146

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mic. Pre-Amp.		6SJ7	8N	
2	Mic. Pre-Amp.		6SJ7	8N	
3	1st AF Amp.		6SC7	8S	
4	AF-Phase Inv.		6SC7	8S	
5	Power Output		6L6G	7AC	
6	" "		6L6G	7AC	
7	Rectifier		5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	450		DY-4x10-450*	BL-310*	AF2222J*	UP111145*	◓ Filter
B	10	450						■ "
C	10	450						▲ "
D	10	450		M-30-450	UT-40	PRS450-30	BR3045	"
9	16	350		M-16-450	UT-163	PRS350-16	BR1635	"
10	40	25		M-50-25	TA-50	PRS25-50	BR502	Cathode Bypass
11	.1	600		S-6-1	TC-1	684-.1	DT6P1	Audio Coupling
12	.1	600		S-6-1	TC-1	684-.1	DT6P1	" "
13	.05	600		S-6-05	TC-15	684-05	DT6S5	" "
14	.02	600		S-6-02	TC-12	684-02	DT6S2	Tone Comp.
15	.05	600		S-6-05	TC-15	684-05	DT6S5	Screen Bypass
16	.05	600		S-6-05	TC-15	684-05	DT6S5	" "
17	5000			MW.5-25	1FM-25	684-005	1D5D5	Audio Coupling
18	5000			MW.5-25	1FM-25	684-005	1D5D5	" "

*Parallel sections to obtain desired capacity.

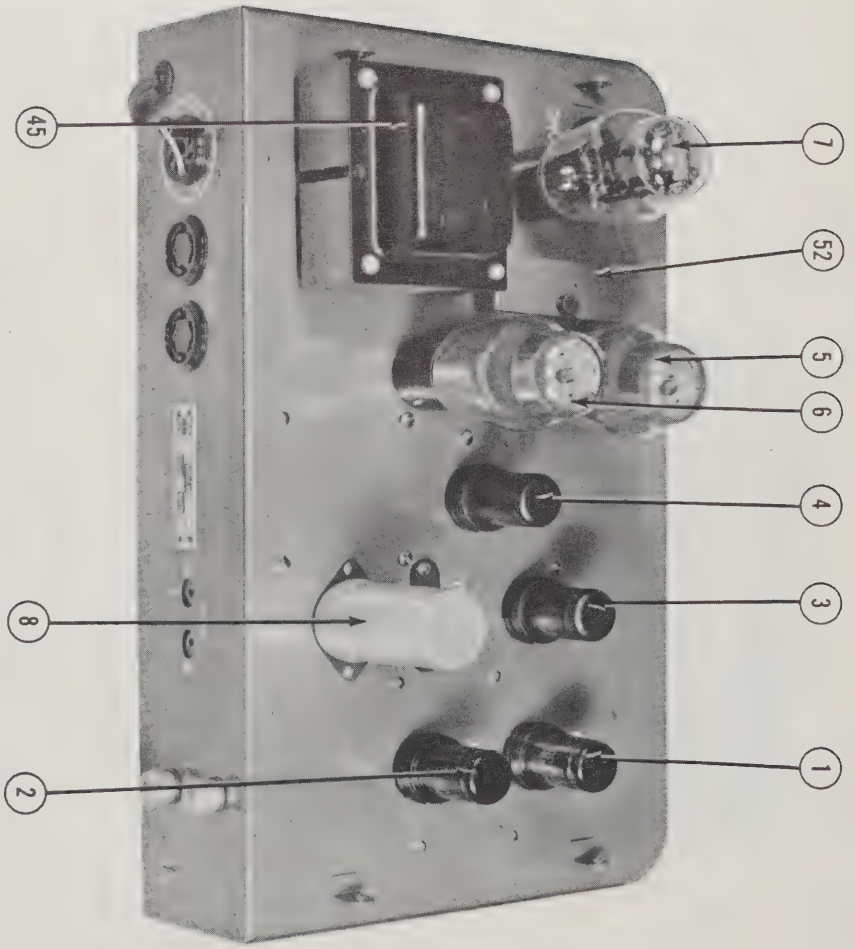
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	500KΩ	½		D13-133	M-60-Z	Mike 1 Volume Control
B	Shaft			A	Not Req.	Attach to 19A per instructions
20A	500KΩ	½		D13-133	M-60-Z	Mike 2 Volume Control
B	Shaft			A	Not Req.	Attach to 20A per instructions
21A	500KΩ	½		D13-133	M-60-Z	Phono Volume Control
B	Shaft			A	Not Req.	Attach to 21A per instructions
22A	250KΩ	½		D13-130	M-64-Z	Tone Control
B	Shaft			A	Not Req.	Attach to 22A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	IRC PART No.	IDENTIFICATION CODES
23	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp. Grid
24	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Grid
25	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp. Screen Dropping
26	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Screen Dropping
27	470KΩ	½		BTS-470K	Y1.-V1.-Y1. 1st Mic. Amp. Plate Load
28	470KΩ	½		BTS-470K	Y1.-V1.-Y1. 2nd Mic. Amp. Plate Load
29	470KΩ	½		BTS-470K	Y1.-V1.-Y1. Isolation
30	470KΩ	½		BTS-470K	Y1.-V1.-Y1. "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	KNIGHT PART No.	IRC PART No.	
31A	2Ω			BW-1-2.2	Feedback
B	750Ω			BTS-680	"
32	600Ω	½		BTS-680	Blue-Blk.-Br. 1st AF Cathode
33	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
34	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd AF Cathode
35	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd AF Plate Load
36	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
37	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Output Grid
38	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " "
39	3900Ω	½		BTS-3900	Or.-White-Red Phase Inverter Grid
40	250Ω	10		AB-250	Output Cathode
41	22KΩ	½		BTS-22K	Red-Red-Or. Decoupling
42	22KΩ	½		BTS-22K	Red-Red-Or. "
43	10KΩ	1		BTA-10K	Br.-Blk.-Or. "
44A	1200Ω	50		AB-1200	Filter
B	5000Ω			EP-5000	Bleeder

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	KNIGHT PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
45	117V AC @ 1.2A	870V CT @ .185A	5.0V AC @ 3.0A	6.3V CT @ 4.0A	LP-0055A	P-6014	T22R06	P-2954

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		KNIGHT PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
46	6000Ω CT	4Ω 6Ω 8Ω 500Ω	400Ω CT	.3Ω .4Ω .5Ω 27Ω	LO-0042A				

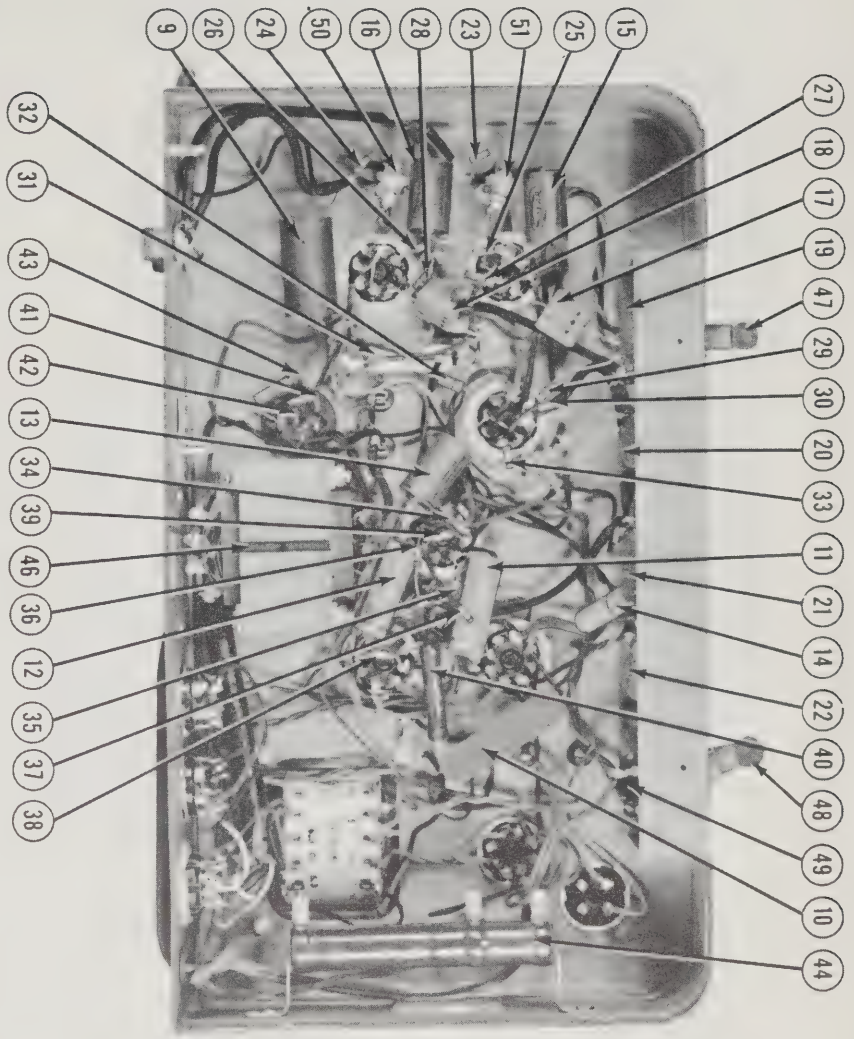
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					KNIGHT PART No.		
47	Bayonet	6-8	0.4	White			Type 55
48	"	6-8	0.4	"			" "

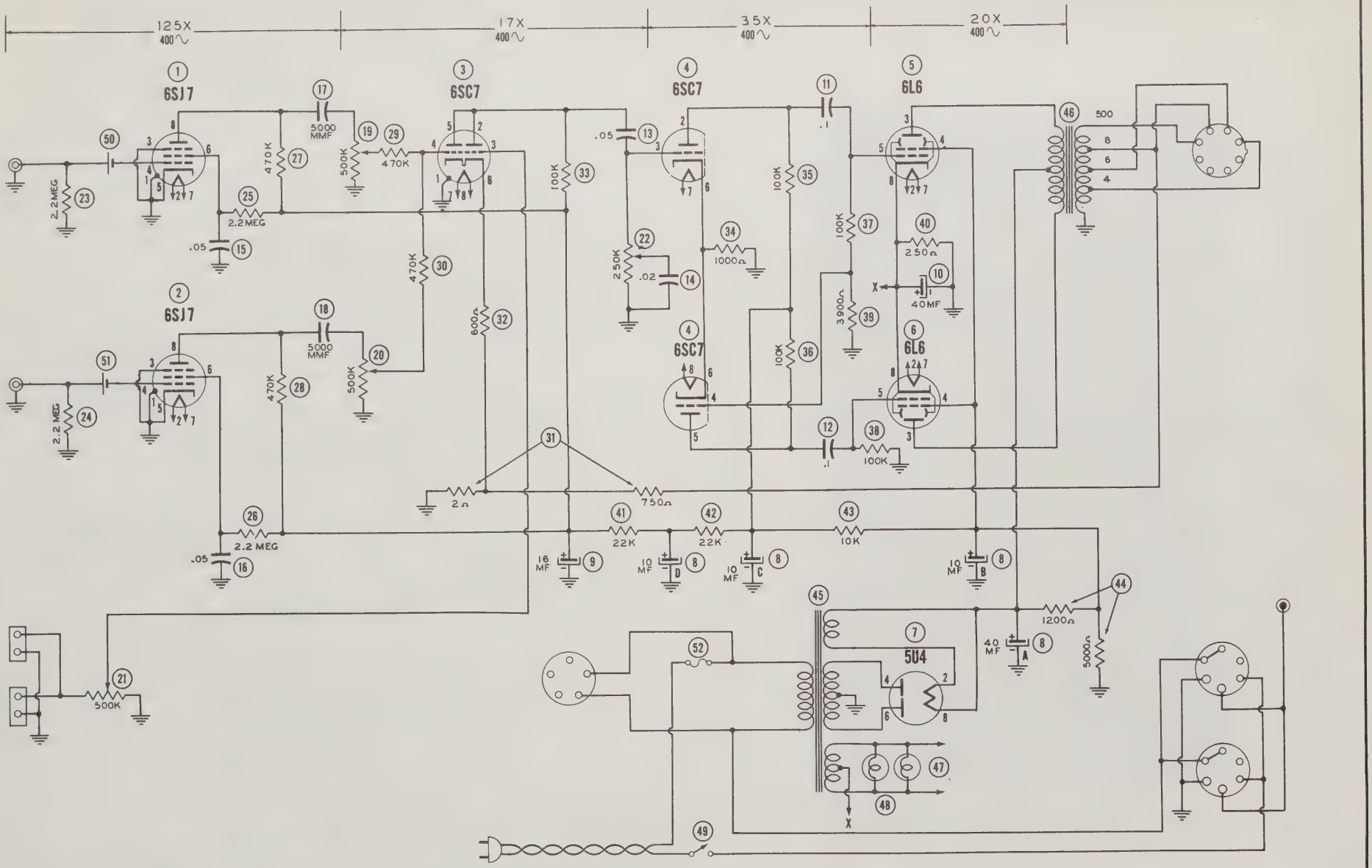
MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
49	Switch		On-Off
50	Bias Cell		
51	" "		
S2	Fuse		3 Amp.

CHASSIS—BOTTOM VIEW



KNIGHT MODEL 93-146



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PHILCO MODEL 46-142
BATTERY OPERATED

PHILCO MODEL 46-142
BATTERY OPERATED

PHILCO MODEL 46-142

TRADE NAME	Philco, Model 46-142
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Battery Operated Superheterodyne Receiver
TUBES (FIVE)	Types, 1LA6 Converter, 1LN5 IF Amp., 1LH4 Det.-AVC-AF (2) 1A5GT Power Output
POWER SUPPLY	1.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form.
RATING	240MA @ 1.5 Volts DC and 10.7MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to 1st small round hole at left end of dial backplate. Use this mark as index mark referred to in Step 2 below.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to ext ant. lead. Low side to chassis.	455KC	Tuning slugs fully closed	Across voice coil	A1,A2, A3	Adjust for maximum output in order given once only.
2	200MMFD	"	1600KC	5½" from index mark.	"	A4	Adjust for maximum output.
3	200MMFD	"	1500KC	Tune for maximum output.	"	A5	" " " "
4	200MMFD	"	580KC	"	"	A6	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made making Step 3 (A5) last adjustment.

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PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 46-142

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1LA6	1LA6	7AK	
2	IF Amp.	1LN5	1LN5	7AO	
3	Det.-AVC-AF	1LH4	1LH4	5AG	
4	Power Output	1A5GT	1A5GT	6X	
5	" "	1A5GT	1A5GT	6X	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6	10	150	30-2540	UT-121	PRS150-12	BR1215	M-10-150	Filter
7	.0015	600	45-3500-6	TC-22	684-002	DT6D2	S-6-002	Output Plate Bypass
8	.0015	600	45-3500-6	TC-22	684-002	DT6D2	S-6-002	" " "
9	.0015	600	45-3500-6	TC-22	684-002	DT6D2	S-6-002	Audio Coupling
10	.0015	600	45-3500-6	TC-22	684-002	DT6D2	S-6-002	" "
11	.0015	600	45-3500-6	TC-22	684-002	DT6D2	S-6-002	" "
12	.05	200	60-0122	TC-15	484-05	DT2S5	S-4-05	AVC Filter
13	.05	200	60-0122	TC-15	484-05	DT2S5	S-4-05	Conv. Screen Bypass
14	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	AF Plate Bypass
15	47	500	60-00515307	1FM-45	1468-00005	5W5Q5	MO.5-45	Tone Comp.
16	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.
17	390	500	30-1220-14					Fixed Trimmer
18	10	500	60-00105407	MS-41	1469-00001	5R5Q1	MOS.5-41	" "
19	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	Ant. Coupling
20	150	500	60-10155407	1FM-315	1468-00015	5W5T15	MO.5-315	Fixed Padder-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
21A	1 Meg.	½	33-5493	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 21A per instructions
C	Switch		" "	42	SW-A2	" " " " "

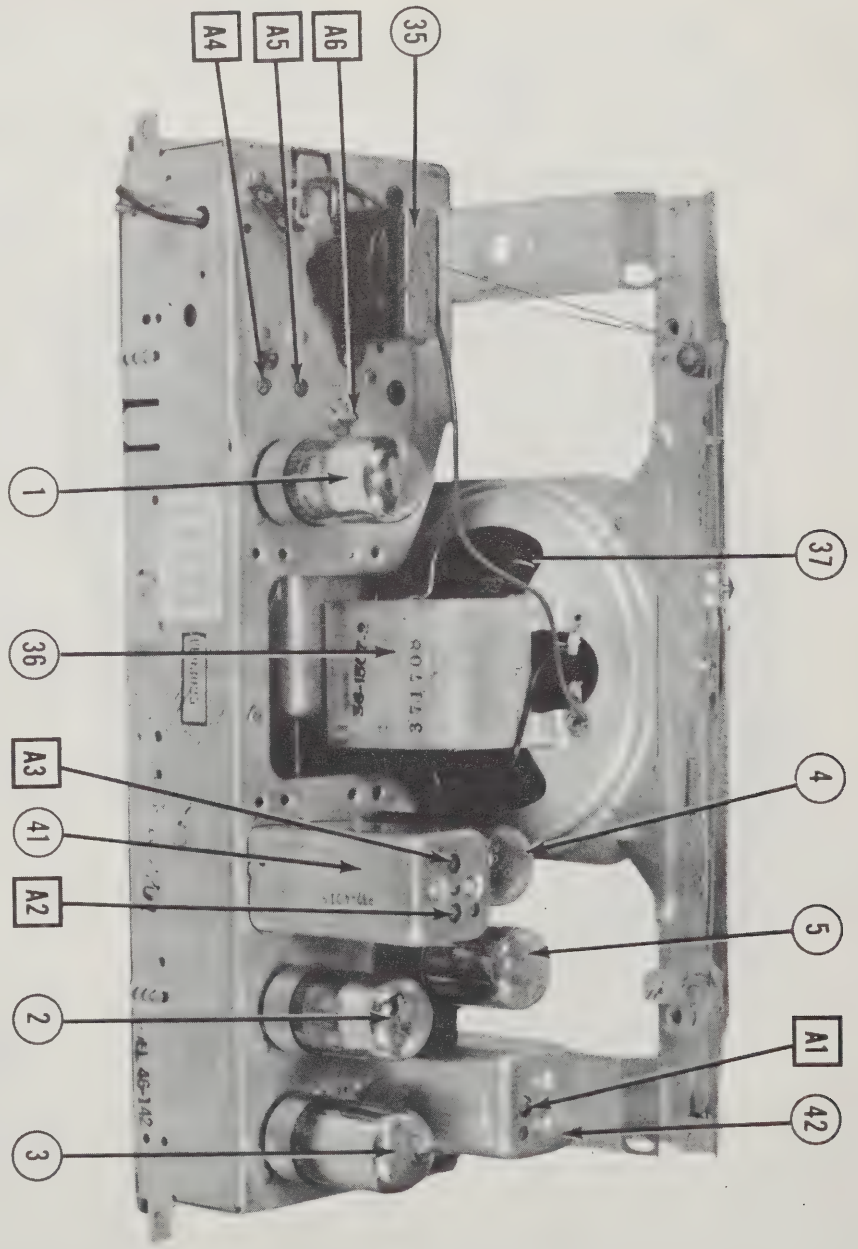
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
22	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Antenna Loading
23	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
24	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Oscillator Grid
25	68KΩ	½	66-3683340	BTS-68K	Blue-Gray-Or. Converter Screen Dropping
26	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
27	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AVC Network
28	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Compensation
29	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
30	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
31	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
32	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
33	1500Ω	½	66-2153340	BTS-1500	Br.-Grn.-Red Output Plate Load
34	560Ω	½	66-1563340	BTS-560	Grn.-Blue-Br. Bias

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
35	7000Ω &7000Ω	3.0Ω	900Ω &1050Ω	.5Ω	32-8289-2				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-1071†		†Use adaptor baffle
36	PM	3.0Ω	36-1507-2	Mod. P5-V	52A21	
	CONE DIA.	VC DIA.				
37	5-1/8"	11/16"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

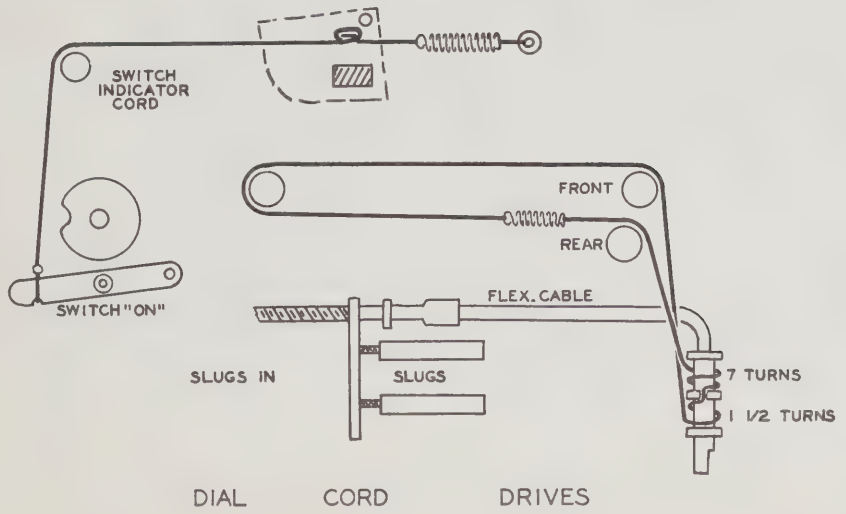
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA MEISSNER PART No.	
38	Ant. Coil		16,5Ω	65-0380-1		Part of Tuning Assby.
39	Osc. Coil		2.6Ω	65-0381-1		
40	Osc. Track. Coil	5Ω	6.5Ω	32-4092		
41	Input IF	15Ω	19Ω	32-3949	16-6658	
42	Output IF	98Ω		32-3897	16-6670	

BATTERIES

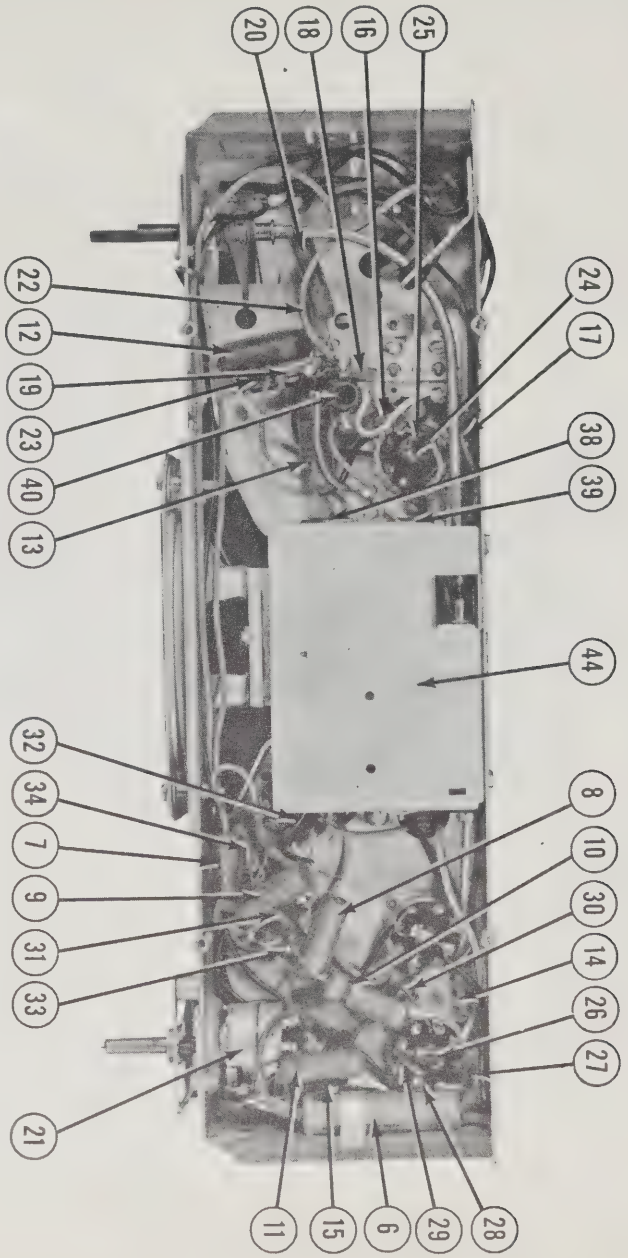
ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
43	1.5V "A" 90V "B"	41-8030			#758			#6TA60	

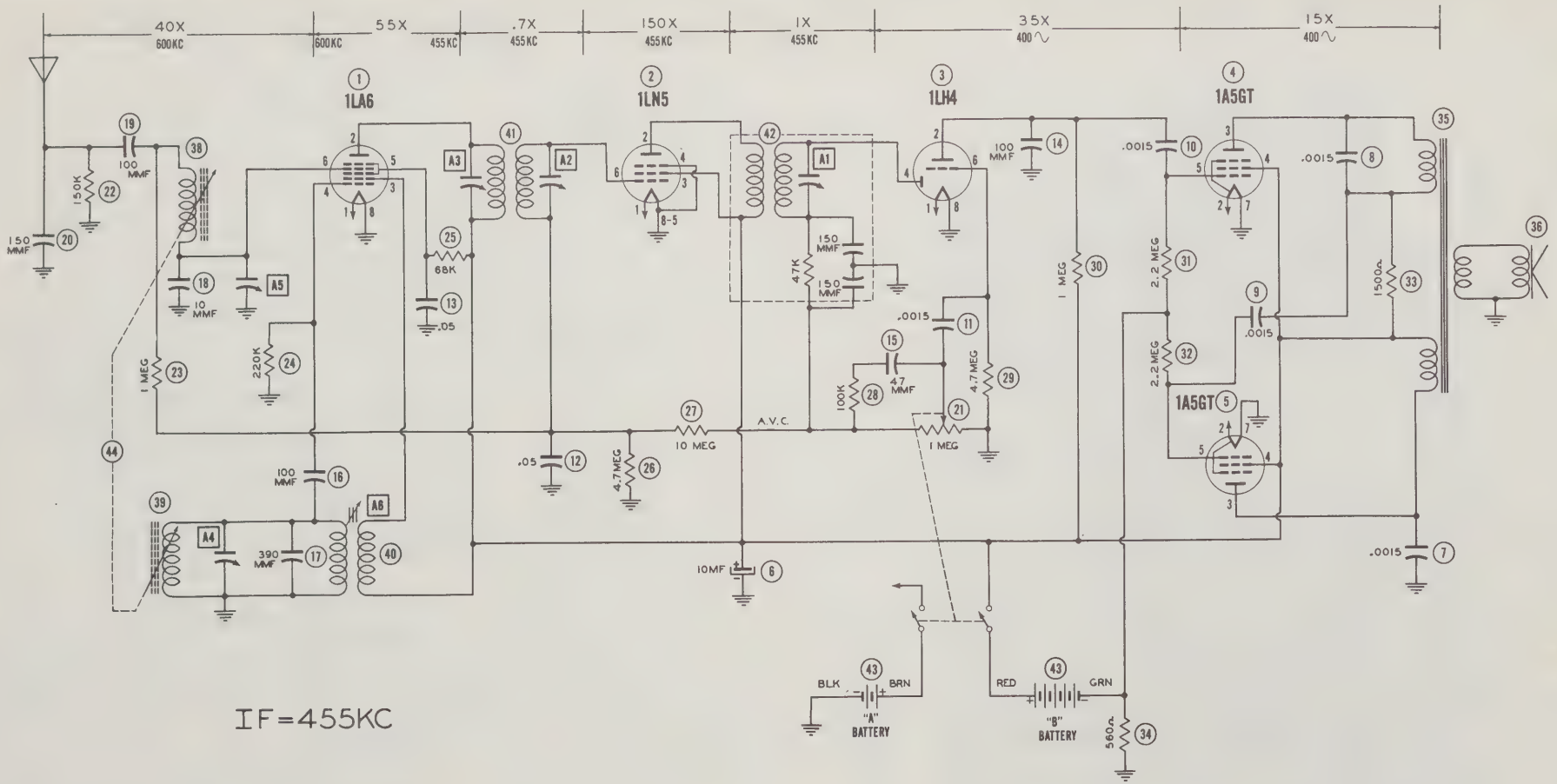
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
44	Tuning Assby.	76-2481	
A4	Dual Trimmer	31-6391	Osc. Adj.
A5	Dual Trimmer	31-6391	Ant. Adj.
	Dial Scale	27-5918	Glass
	Knob	54-4375	
	Dial Pointer	56-2159FCP	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1LA6	1.5VDC	85VDC	85VDC	-5VDC§	36VDC	0V.	85VDC	0V.
2	1LN5	1.5VDC	85VDC	85VDC	0V.	0V.	0V.	0V.	0V.
3	1LH4	1.5VDC	50VDC	0V.	0V.	0V.	0V.	0V.	0V.
4	1A5GT	-6VDC	1.5VDC	82VDC	85VDC	-2VDC	80VDC	0V.	-2VDC
5	1A5GT	-6VDC	1.5VDC	82VDC	85VDC	-2VDC	85VDC	0V.	80VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1LA6	*	50KΩ	50KΩ	220KΩ	120KΩ	5.7 Meg.	50KΩ	0Ω
2	1LN5	*	50KΩ	50KΩ	0Ω	0Ω	4.7 Meg.	4.7 Meg.	0Ω
3	1LH4	*	1 Meg.	4.7 Meg.	1 Meg.	1 Meg.	4.7 Meg.	1 Meg.	0Ω
4	1A5GT	550Ω	*	50KΩ	50KΩ	2.2 Meg.	50KΩ	0Ω	2.2 Meg
5	1A5GT	550Ω	*	50KΩ	50KΩ	2.2 Meg.	50KΩ	0Ω	50KΩ

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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486-16

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODEL
48-1253

PHILCO MODEL
48-1253

PHILCO MODEL 48-1253

TRADE NAME	Philco, Model 48-1253
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 7A8 Converter, 7B7 IF Amp., 7C6 Det.-AVC-AF, 50A5 Power Output, 50X6 Rectifier.
POWER SUPPLY	105-120 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .37 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Alignment should be done with receiver mounted in cabinet with bottom plate removed from chassis.

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 6 (grid) 7A8. Low side to B-.	455KC	Tuning cap. fully closed	Across center and right hand terminals of strip behind 7A8	A1,A2, A3,A4.	Tighten A1 down firmly. Then adjust A1, A2, A3 & A4 for maximum output in order given.
2		Loop	1600KC	Tuning cap. fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 3/48-#486-17 SET #36-FOLDER #17

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	Converter	7A8	7A8	8U	
2	IF Amp.	7B7	7B7	8V	
3	Det.-AVC-AF	7C6	7C6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	50X6	50X6		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6	15	200	30-2568-13	UT-202	PRS150-20	BR2025	M-20-350	Filter
7	15	200	30-2575-11	EL-12	AF4F	UP2025	DY-20-350	"
8A	40	250	30-2568-14	EL-341§	AF44F*	UP2225*	DY-2x20-350*	■ Filter
B	10	250			PRS250-12	BR1225	M-10-350	▲ "
9	.05	400	61-0122	TC-15	484-05	DT4S5	MPH-4-05	Line Filter
10	.05	200	61-0122	TC-15	484-05	DT2S5	S-4-05	Output Plate Bypass
11	.006	400	45-3500-7	TC-26	484-006	DT6D6	S-6-006	Audio Coupling
12	.01	600	61-0120	TC-11	684-01	DT6S1	S-6-01	" "
13A	.01	600	61-0120	TC-11	684-01	DT6S1	S-6-01	Phono Isolation-See Note 2
B	.2	400	45-3500-3	TC-2	484-.2	DT4P2	S-4-2	Phono Isolation
14	.05	400	61-0122	TC-15	484-05	DT4S5	S-4-05	Phono Motor Isolation
15	.05	200	61-0122	TC-15	484-05	DT2S5	S-4-05	Screen Bypass
16	.05	200	61-0122	TC-15	484-05	DT2S5	S-4-05	AVC Filter
17A	.08	400	76-3547					Line Isolation-See Note 2
B	.2	400	76-1161		484-.2	DT4P2	S-4-2	" " " " 1
18	220	500	60-10205307	1FM-325	1468-00025	5W5T25	MO.5-325	Output Grid Bypass-Cer.
19	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter-Cer.
20	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	" " "
21	10	500	30-1224-26					Temp. Comp. Trimmer-Cer.-Note 2
22	47	500	60-00515307	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.-See Note 2
23	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling-Cer.
24	5	500	30-1221-5	MS-55	1468-000005	5W5V5	MO.5-55	Ext. Ant. Coupling-Cer.

§Omit bypass section. *Parallel sections to obtain desired capacity.
Note 1 - Wind same number turns on replacement as original.
Note 2 - Used in later productions.

CONTROLS

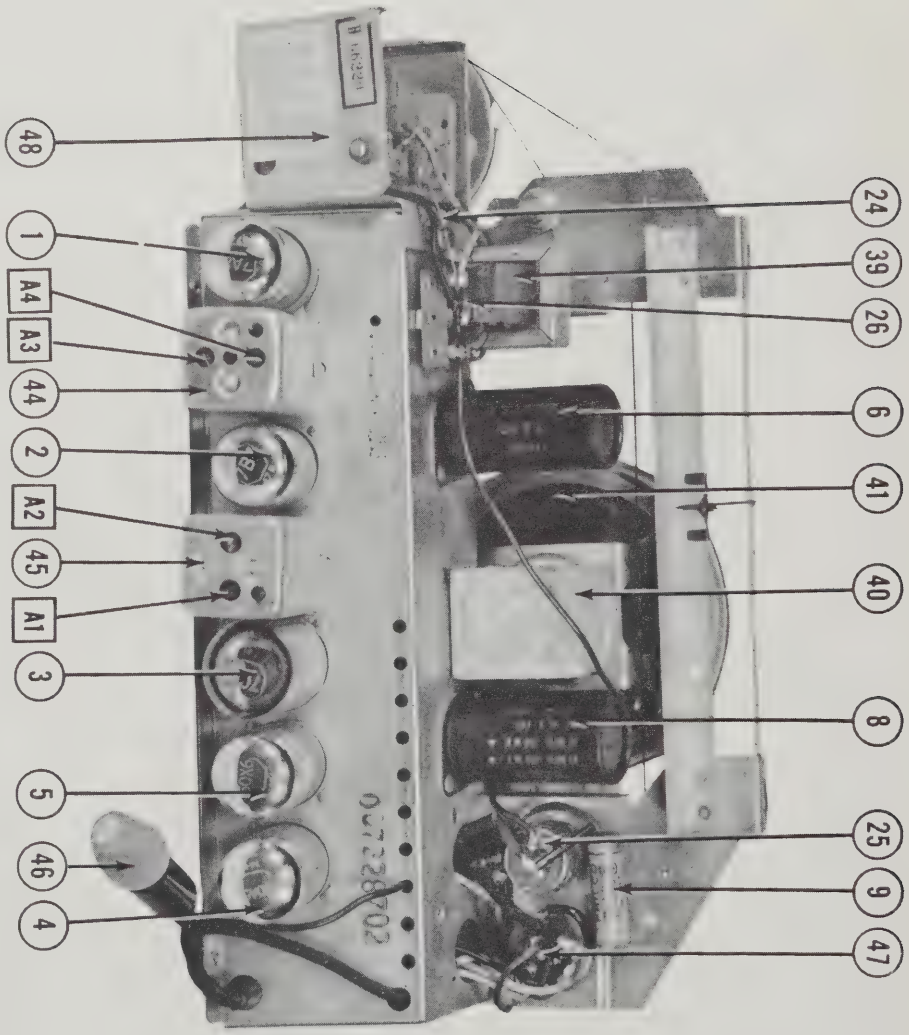
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
25A	500KΩ	½	33-5588	D13-133‡	M-60-2‡	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 25A per instructions
C	Switch		" "	41	SW-A	" " " " "

‡Use original bushing to actuate radio-phono switch.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
26	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Antenna Loading
27	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
28	120KΩ	½	66-4123340	BTS-120K	Br.-Red-Yl. Oscillator Grid
29	120KΩ	½	66-4123340	BTS-120K	Br.-Red-Yl. Line Isolation
30	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Screen Dropping
31	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
32	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
33	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
34	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
35	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
36	130Ω	2	66-1133340	BW-½-130	Br.-Or.-Br. Output Cathode
37	15KΩ	1	66-3154340	BTA-15K	Br.-Grn.-Or. Filter
38	500Ω	5	33-3435-3	AB-500	"

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
39	2400Ω	3.4Ω	320Ω	.6Ω	32-8329	A-3876**	T22S45**	A-2928**	**Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105†		†Drill and tap magnet frame.
40	PM	3.4Ω	36-1625	Mod. P5-X	5A15#	#Drill new mounting holes.
	CONE DIA.	VC DIA.				
41	4½"	½"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

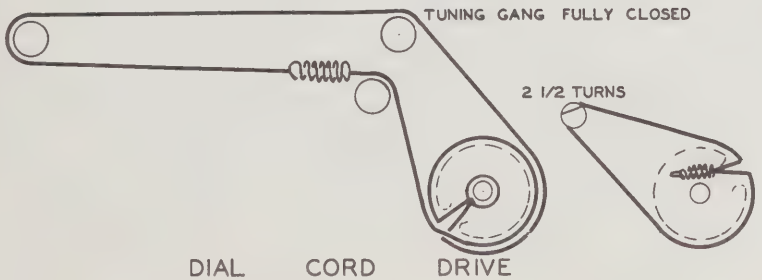
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.
42	Loop Ant.		2.9Ω	76-2127-5	
43	Osc. Coil	2.5Ω	7Ω	32-4095-2	14-1060
44	Input IF	21.8Ω	21.5Ω	32-3962-2	16-6658
45	Output IF	21.5Ω	20Ω	32-3948-11	16-6660

DIAL LIGHT

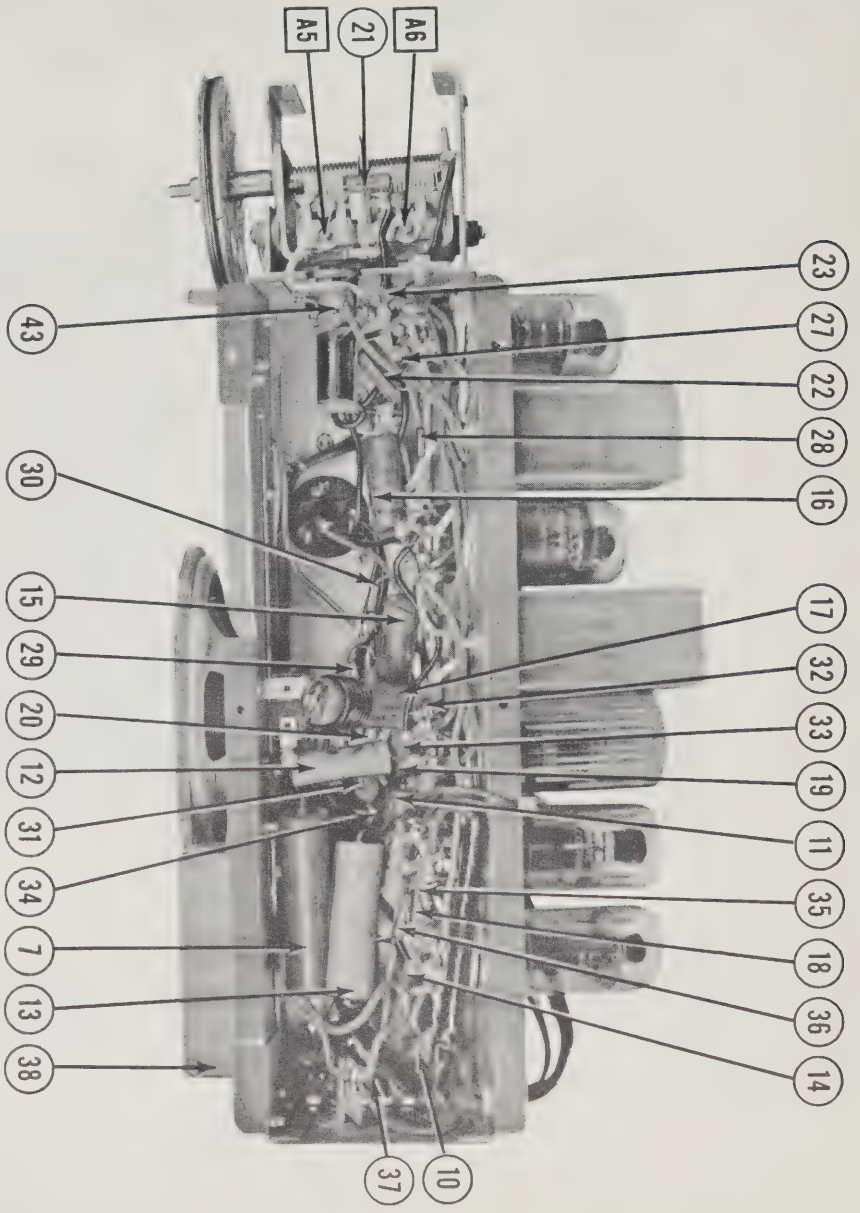
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
46	Screw	120			34-2477		Type C-7

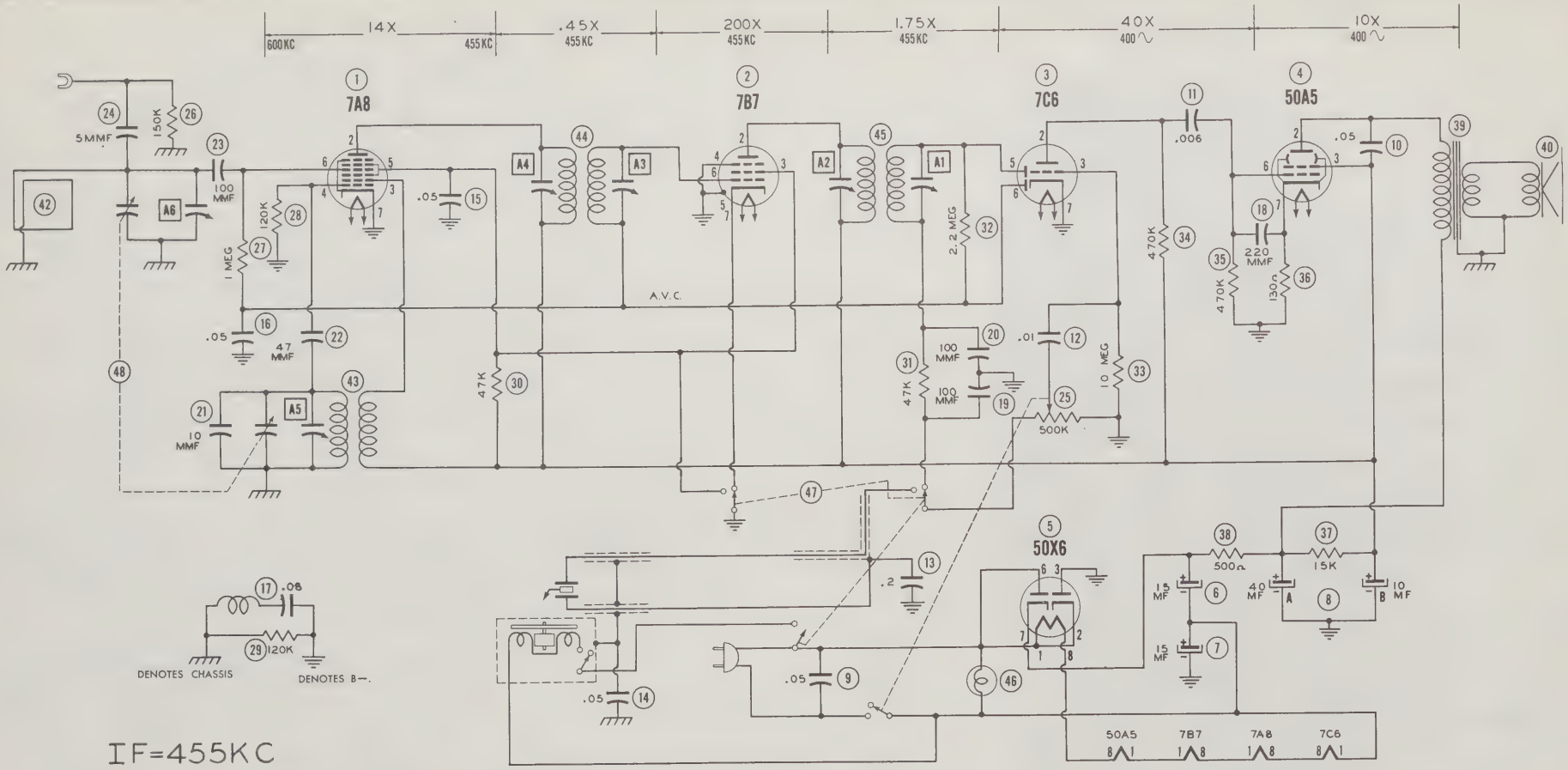
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
47	Switch	42-1624	Radio-Phono
48	2 Gang Var. Cap.	31-2727-1	(27-496MMF, 24-165MMF)
	Dial Pointer	56-4992	
	Dial Scale	27-5976	



CHASSIS—BOTTOM VIEW





IF=455KC

RADIO-PHONO SWITCH IN RADIO POSITION.

*ALL AC VOLTAGE AND RESISTANCE READINGS TAKEN FROM PIN #1 OF TUBE #3.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	12VAC*	90VDC	90VDC	-12VDC§	39VDC	-.5VDC	0V.	6VAC*
2	7B7	18VAC*	90VDC	39VDC	0V.	0V.	-.5VDC	0V.	12VAC*
3	7C6	0V.*	49VDC	-.5VDC	0V.	-.5VDC	-.5VDC	0V.	6VAC*
4	50A5	18VAC*	192VDC	90VDC	0V.	0V.	0V.	5.8VDC	65VAC*
5	50X6	117VAC*	117VAC*	0V.	0V.	5.8VDC	117VAC*	230VDC	65VAC*

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	14Ω*	105KΩ	165KΩ	120KΩ	200KΩ	4 Meg.	0Ω	8Ω*
2	7B7	20Ω*	165KΩ	200KΩ	0Ω	0Ω	3 Meg.	0Ω	14Ω*
3	7C6	0Ω*	620KΩ	10 Meg.	0Ω	550KΩ	3 Meg.	0Ω	8Ω*
4	50A5	20Ω*	150KΩ	165KΩ	INF.	0Ω	470KΩ	120Ω	70Ω*
5	50X6	100Ω*	100Ω*	0Ω	0Ω	120Ω	100Ω*	150KΩ	70Ω*

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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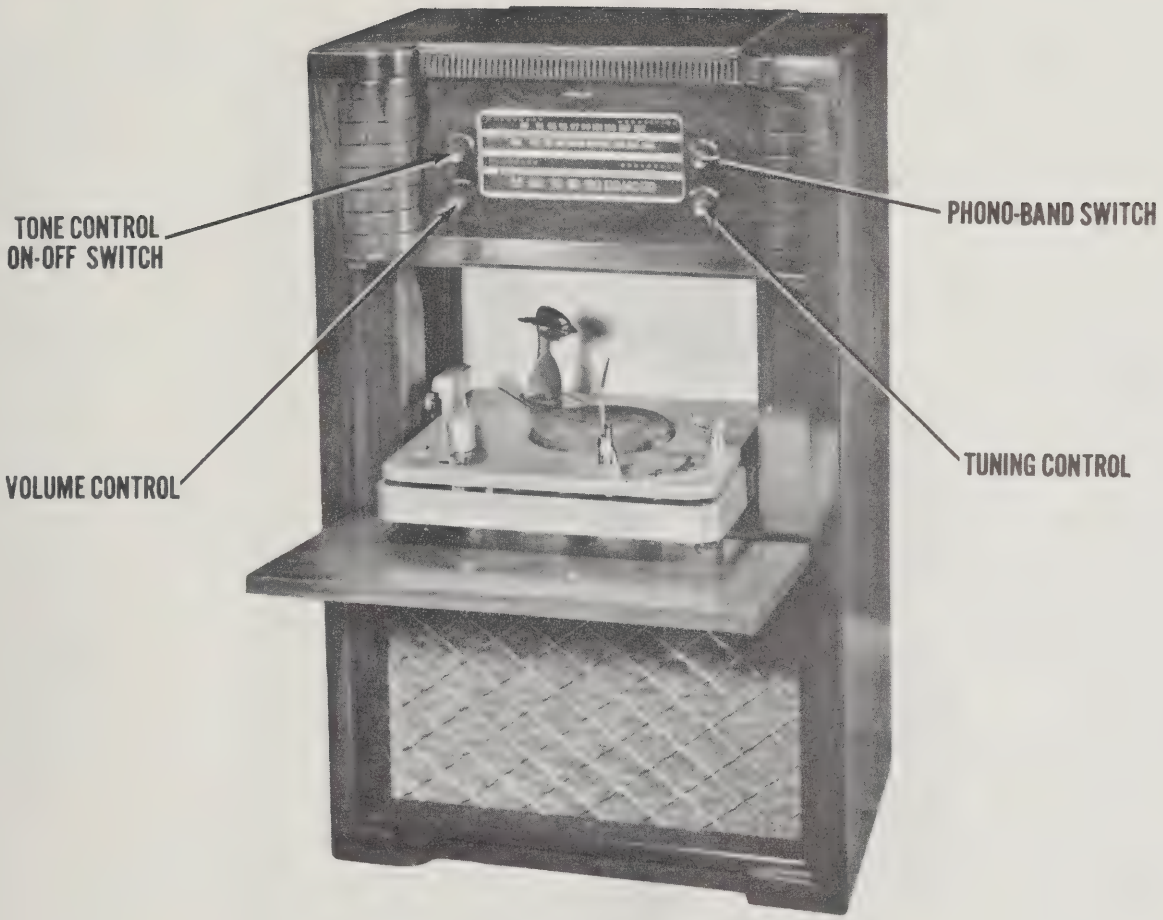
486-17

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODEL
48-1264



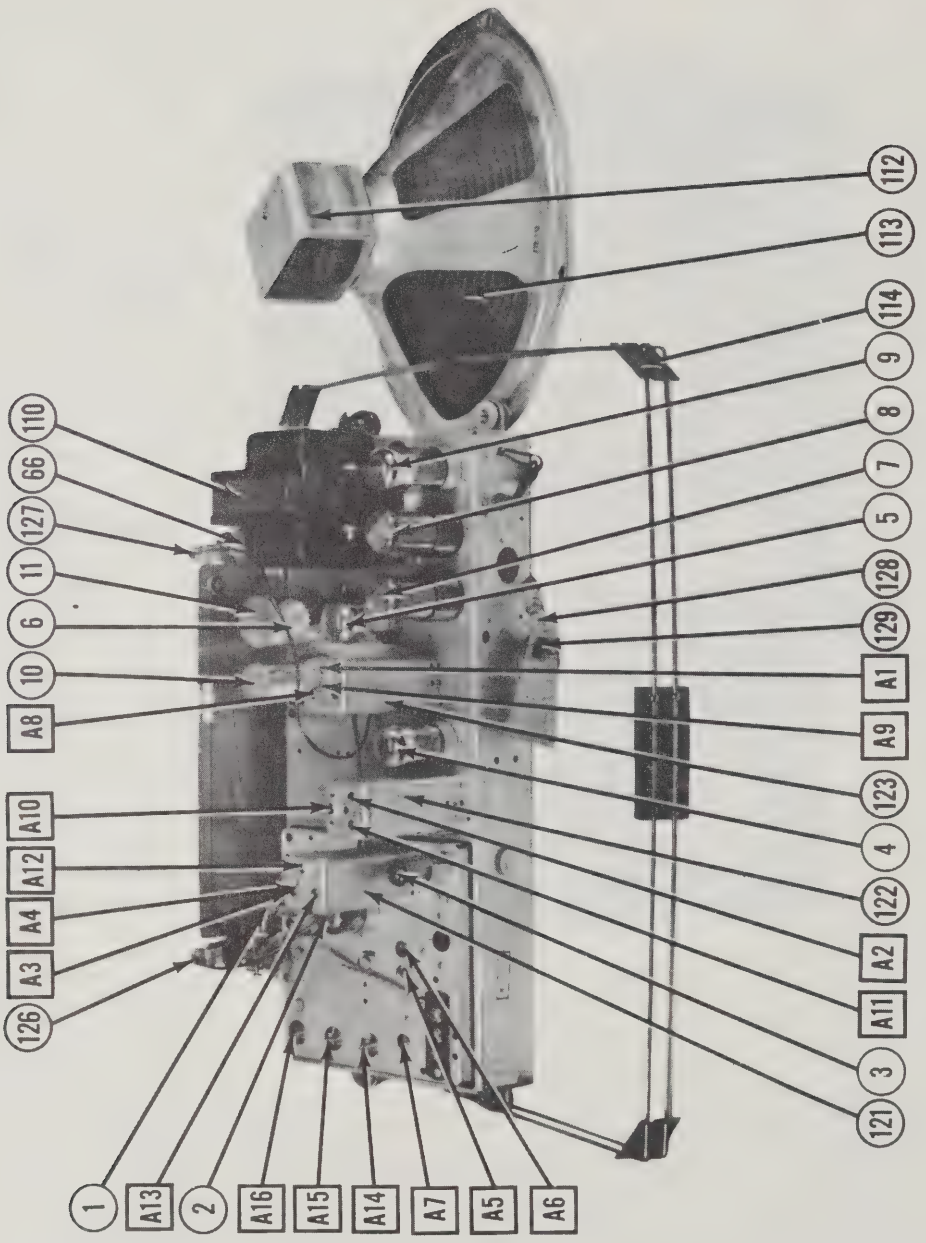
PHILCO MODEL
48-1264

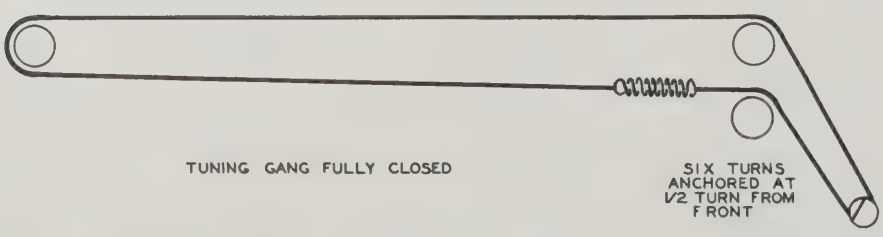
PHILCO MODEL 48-1264

TRADE NAME	Philco, Model 48-1264
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver
TUBES (NINE)	Types, 6AG5 or 6AU6 FM RF Amp., 7F8 Converter, 6BA6 1st IF Amp., 7R7 2nd IF Amp.-AM Det.-AVC, 7X7 FM Det.-1st AF, 6J5GT Phase Inv., (2) 6K6GT Power Output, 5AZ4 Rectifier.
POWER SUPPLY	105-120 Volts AC
RATING	.83 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1720KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc."





DIAL CORD DRIVE

A
B
47 38 93 15 87 105 106 18 39 107 17 37 12 111 99 100 14 16 20 104 13 97 103 19 101 22
27 42 89 91 94 25 92 50 28 88 48 82 83 29 86 81 85 84 51 49 33 52 80 79 41 35 53 34 125
65 40 95 96 102 98 46 45 21 109 24 43 90 108 26 44 30 31 32 73 61 70 60 124 69 63 68 59 62 67
36 72 78 117 64 130 118 77 58 57 131 71 55 74 120 56 116 75 54 119 76

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1A	FM RF Amp.	6AG5	6AG5	7BD	
B	FM RF Amp.	6AU6	6AU6	7BK	Used in later productions
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.-AM Det.-AVC	7R7	7R7	8AE	
5	FM Det.-1st AF	7X7	7X7	8BZ	
6	Phase Inv.	6J5GT	6J5GT	6Q	
7	Power Output	6K6GT	6K6GT	7S	
8	" "	6K6GT	6K6GT	7S	
9	Rectifier	5AZ4	5AZ4		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10	20	450	30-2555	DY-20-450	EL-2	AF4J	UP2045	Filter
11A	25	450	30-2556	DY-313*	EL-330*	AF444J*	UP2250	"
B	10	450						"
12	2	50	30-2417	M-4-450	TA-55	PR8150-4	BR415	Stabilizing Cap.
13	.01	600	61-0120	MPH-6-01	TC-11	684-01	DT6S1	Line Filter
14	.01	600	61-0120	MPH-6-01	TC-11	684-01	DT6S1	" "
15	.003	1000	61-0117	TM-16-003	TR-23	1084-003	MD16D3	Output Plate Bypass
16	.1	200	61-0113	S-2-1	TC-1	484-.1	DT2P1	Bias Filter
17	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	Audio Coupling
18	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	" "
19	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	" "
20	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	Tone Comp.
21	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	Audio Coupling
22	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	Tone Comp.
23	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	FM Test Coupling-See Note
24	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	Audio Coupling
25	.008	400	61-0174	S-6-006	TC-26	484-006	DT6D6	Diode Load Cap.
26	.006	400	45-3500-7	S-6-006	TC-26	484-006	DT6D6	Audio Coupling
27	.05	400	61-0122	S-4-05	TC-15	484-05	DT4S5	2nd IF Plate Decoup.
28	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	2nd IF Screen Bypass
29	.05	400	61-0122	S-4-05	TC-15	484-05	DT4S5	2nd IF Cathode Bypass
30	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	AVC Filter
31	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	RF Bypass Pwr. Supply
32	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	" " " "
33	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	1st IF Plate Decoupling
34	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	1st IF Screen Bypass
35	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	AVC Filter
36	.01	400	61-0120	S-4-01	TC-11	484-01	DT4S1	Conv. Plate Decoup.
37	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	AF Plate Bypass
38	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Filament Bypass-Cer.
39	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	" " "
40	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Tone Comp.
41	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	RF Bypass-Cer.
42	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	" " "
43	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	" "
44	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Diode RF Filter-Cer.
45	100	500	60-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	" " " "
46	6	500	30-1224-9	MO.5-55	MS-55	1468-000005	5W5V5	Neutralizing Cap.-Cer.
47	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	RF Bypass
48	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Filament Bypass-Cer.
49	250	500	60-10255237	MO.5-325	1FM-325	1468-00025	5W5T25	2nd IF Grid Filter-Cer.
50	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	IF Coupling
51	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	1st IF Plate Decoup.-Cer.
52	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Filament Bypass-Cer.
53	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	AVC Filter-Cer.
54	220	500	60-10245307	MO.5-325	1FM-325	1468-00025	5W5T25	Osc. Feedback-Cer.
55	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.-Cer.
56	750	500	60-10755301	MW.5-38	1FM-37	1468-00075	1W5T8	Osc. Coupling
57	100	500	61-10105407	MO.5-31	1FM-31	1468-0001	5W5T1	Filament Bypass-Cer.
58	220	500	60-10245307	MO.5-325	1FM-325	1468-00025	5W5T25	RF Coupling-Cer
59	33	500	60-00305307	MO.5-44	1FM-44	1468-00004	5W5Q4	" " "

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	RATING: SEC. 4	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No
110	117V AC @ .83A	640V CT @ .112A	5.0V AC @ 2.0A	6.5V AC @ 2.2A	6.6V CT @ .6A	32-8248	P-4080‡	T22R32	P-3153‡

‡Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
111	8200Ω CT	3.7Ω	580Ω CT	.5Ω	32-8274	A-3824	T22S56	A-2036‡	‡Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS: FIELD RES	RATINGS: VC IMP.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
112	650Ω	3.7Ω	36-1611-3	ST-744 Mod. F12-S	12P60†	†Replace output transformer to match 6-8Ω voice coil.
113	CONE DIA. 11½"	VC DIA. 3/4"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: MEISSNER PART No.	
114	Loop Ant.		.1Ω	76-2262-1		
115	FM Ant.		INF.			
116	BC Ant.Coil		2Ω	32-4033-2		
117	FM " "		0Ω	32-4158		
118	FM RF Coil		0Ω	32-4159		
119	BC Osc.Coil		3.5Ω	32-4019-4	14-1040	
120	FM Osc. "		0Ω	32-4018-2		
121A	AM Input IF	1.2Ω	1.2Ω	32-4146		
B	FM " "	1.2Ω	20Ω			
122A	AM Inter.IF	6Ω§	11Ω#	32-4156		
B	FM " "					
123A	AM Output IF	11Ω§	10Ω	32-4147		
B	Disc. Trans.		1Ω			
124	Plate Choke		.1Ω	32-4061		
125	" "		0Ω	32-4157		Wound on 1500Ω resistor.

§Includes AM & FM primary. #Includes AM & FM secondary.

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILCO PART No.		INSTALLATION NOTES
126	Bayonet	6-8	0.25	Blue	34-2064		Type 44
127-128	"	6-8	0.4	White	34-2039		Type 55

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
60	1500	500	60-20155404	MW.5-215	1FM-215	1467-0015	1W5D15	FM RF Plate Decoup.-Cer.
61	1500	500	60-20155404	MW.5-215	1FM-215	1467-0015	1W5D15	RF Bypass Pwr. Supply-Cer
62	100	500	61-1010540?	MO.5-31	1FM-31	1468-0001	5W5T1	FM RF Screen Bypass-Cer.
63	100	500	61-1010540?	MO.5-31	1FM-31	1468-0001	5W5T1	" " Cathode Bypass-Cer.
64	100	500	61-1010540?	MO.5-31	1FM-31	1468-0001	5W5T1	Filament Bypass-Cer.

*Omit one section. Note-Not used in some models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
65A	2 Meg.	½	33-5535-1	D1c-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 65A per instructions
66	6 Meg.	½	33-5533-1			Tone Control & Sw.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
67	10Ω	½	66-0103340	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor
68	150Ω	½	66-1151540	BW-½-150	Br.-Grn.-Br. FM RF Cathode
69	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. FM RF Screen Dropping
70	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red FM RF Plate Decoupling
71	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Converter Grid
72	1500Ω	½	66-2153340	BTS-1500	Br.-Grn.-Red Converter Cathode
73	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Converter Plate Decoupling
74	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. Oscillator Grid
75	4700Ω	½	66-2473340	BTS-4700	Yl.-Vi.-Red Oscillator Plate Load
76	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Oscillator Plate Load
77	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Converter Grid
78	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
79	68Ω	½	66-0683340	BW-½-68	Blue-Gray-Blk. 1st IF Cathode
80	27KΩ	½	66-3273340	BTS-27K	Red-Vi.-Or. 1st IF Screen Dropping
81	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
82	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
83	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Diode Load
84	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. 2nd IF Grid
85	150Ω	½	66-1153340	BW-½-150	Br.-Grn.-Br. 2nd IF Cathode
86	68KΩ	½	66-3683340	BTS-68K	Blue-Gray-Or. 2nd IF Screen Dropping
87	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
88	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Diode Load
89	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
90	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Diode Filter
91	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. De-emphasis
92	6.8 Meg.	½	66-5683340	BTS-6.8 Meg.	Blue-Gray-Grn. FM Detector Load
93	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Ratio Detector Diode Load
94	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. RF Filter
95	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Tone Compensation
96	4.7Ω	½	66-0473340	BW-½-4.7	Yl.-Vi.-Gold Feedback
97	68Ω	½	66-0683340	BW-½-68	Blue-Gray-Blk. "
98	820KΩ	½	66-4823340	BTS-820K	Gray-Red-Yl. Phono Shunt-See Note 1
99	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
100	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Load
101	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Phase Inverter Grid
102	4700Ω	½	66-2473340	BTS-4700	Yl.-Vi.-Red Phase Inverter Cathode
103	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. " " "
104	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. Phase Inverter Plate Load
105	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Output Grid
106	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. " "
107	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Bias Network
108	165Ω	5	34-3435-1	AB-200	" " " - See Note 2
109	15KΩ	2	66-3155340	BT-2-15K	Br.-Grn.-Or. Filter

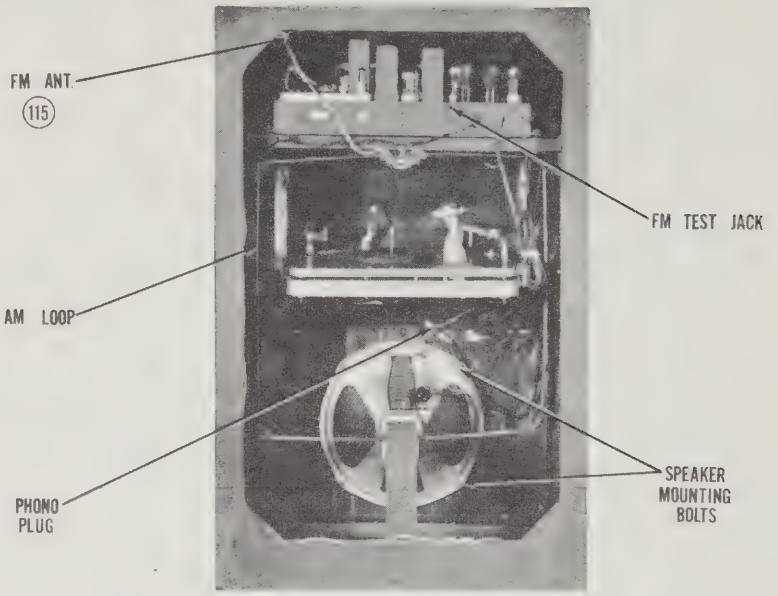
Note 1-Some models use 1 Meg. in this application. Replacement same as #83.
Note 2-On IRC replacement set slider at 165Ω from one end.

DATE 3/48-#496-18
SET #36-FOLDER #18

PARTS LIST AND DESCRIPTIONS (Continued)

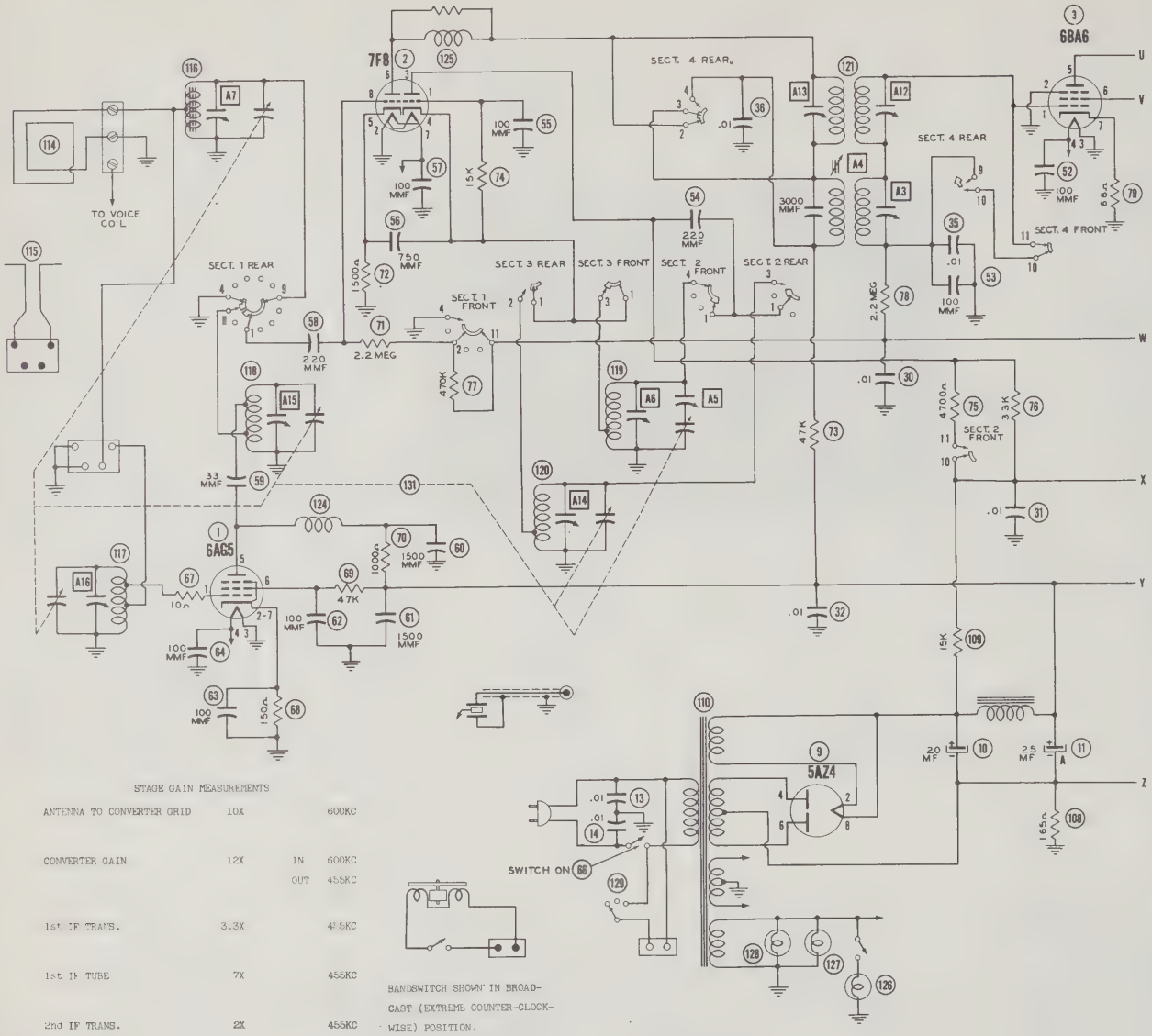
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
129	Switch	Part of 42-1803	Phono Motor
130	"	42-1803	Band-Phono
131	Tuning Gang	31-2700-2	AM (10-514Mμf) each section
A5	Trimmer Strip	31-6476-5	BC Osc. Pad.
A6			" " Adj.
A7	Trimmer	31-2703-2	BC Ant. Adj.
	Dial Scale	76-3187-1	
	Dial Pointer	56-3179	
	Knob	54-4486	



DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove loop leads from terminal strip on chassis.
3. Remove one Phillips head wood screw holding loop antenna in cabinet. Remove loop from cabinet.
4. Remove FM antenna plug from chassis.
5. Remove speaker plug from speaker.
6. Disconnect phono-pickup plug.
7. Remove phono motor plug from chassis.
8. Remove phono compartment light switch from cabinet.
9. Remove phono compartment light socket from cabinet.
10. Remove four hex head bolts holding chassis in cabinet. Remove chassis from cabinet.
11. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



STAGE GAIN MEASUREMENTS

ANTENNA TO CONVERTER GRID	10X		600KC
CONVERTER GAIN	12X	IN	600KC
		OUT	455KC
1st IF TRANS.	3.3X		455KC
1st IF TUBE	7X		455KC
2nd IF TRANS.	2X		455KC
2nd IF TUBE	250X		455KC
3rd IF TRANS.	1.5X		455KC
1st AUDIO	45X		400~
INVERTER	.8X		400~
OUTPUT	16X		400~

BANDSWITCH SHOWN IN BROADCAST (EXTREME COUNTER-CLOCKWISE) POSITION.

BANDSWITCH SEQUENCE:

1. BROADCAST
2. FM
3. PHONO

IF=455KC AM

IF=9.1MC FM

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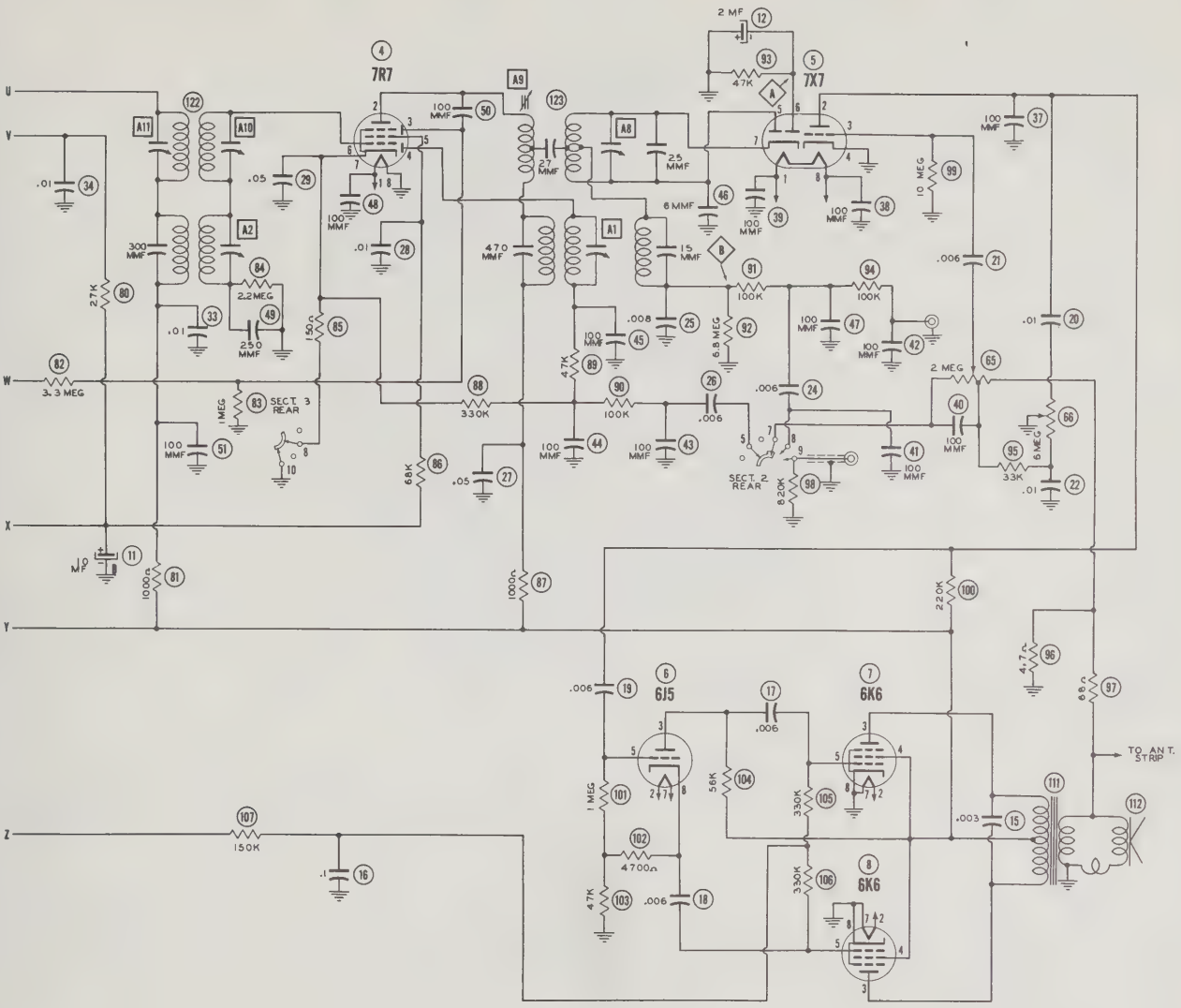
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	0V.	1.5VDC	0V.	6.5VAC	250VDC	160VDC	1.5VDC	-
	2	7F8	-5VDC§	6.5VAC	105VDC	0V.	4VDC	145VDC	0V.	-
	3	6BA6	0V.	0V.	0V.	6.5VAC	250VDC	100VDC	1VDC	-
	4	7R7	6.5VAC	260VDC	0V.	-.3VDC	110VDC	0V.	1.1VDC	0V.
‡	5	7X7	3.3VAC	125VDC	-.5VDC	0V.	-.4VDC	-.6V.C	-.4VDC	3.3VAC
	6	6J5	0V.	3.3VAC	192VDC	60VDC	1.3VDC	0V.	3.3VAC	65VDC
	7	6K6GT	0V.	6.5VAC	260VDC	260VDC	-.13VDC	260VDC	0V.	0V.
	8	6K6GT	0V.	6.5VAC	260VDC	260VDC	-13VDC	0V.	0V.	0V.
	9	5AZ4	0V.	330VDC	0V.	320VAC	0V	320VAC	0V.	330VDC

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	10.5Ω	150Ω	0Ω	.1Ω	5.1KΩ	100KΩ	150Ω	-
	2	7F8	15KΩ	.1Ω	100KΩ	.5Ω	1.5KΩ	100KΩ	0Ω	7 Meg.
	3	6BA6	7 Meg.	0Ω	0Ω	.1Ω	50KΩ	90KΩ	68Ω	-
	4	7R7	.1Ω	50KΩ	1 Meg.	340KΩ	130KΩ	2.2 Meg.	140Ω	0Ω
‡	5	7X7	.15Ω	270KΩ	10 Meg.	0Ω	7 Meg.	45KΩ	7 Meg.	.15Ω
	6	6J5	0Ω	.15Ω	110KΩ	47KΩ	1.1 Meg.	900KΩ	.15Ω	52KΩ
	7	6K6GT	INF.	.1Ω	50KΩ	50KΩ	500KΩ	50KΩ	0Ω	0Ω
	8	6K6GT	INF.	.1Ω	50KΩ	50KΩ	500KΩ	INF.	0Ω	0Ω
	9	5AZ4	INF.	50KΩ	INF.	250Ω	INF.	360Ω	INF.	50KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning cap. fully closed and mark setting of pointer. This is the index mark referred to in Steps below.

Use insulated alignment screwdriver for all adjustments.

When complete AM & FM alignments are to be made AM alignment must be done first. If FM alignment is not required AM alone may be made.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to term. #1 of ant. terminal strip. Low side to chassis.	455KC	BC (counter clock-wise)	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. Do not repeat adjustments.
2		Loop	580KC	"	7/8" to right of index mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1700KC	"	6-7/16" from index mark.	"	A6	Adjust for maximum output.
4		"	1500KC	"	Tune for maximum output.	"	A7	" " " "
5		"	580KC	"	"	"	A5	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made making Step 4 the last adjustment.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	.1 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	9.1MC (400$\sim$ amplitude modulation)	FM (center position)	Tuning cap. fully closed	DC probe to Point (A). Common to chassis	A8,A9, A10,A11	Attenuate sig. gen. to give approximately 9 volt reading on 10 volt scale. Adjust A8, A9, A10 & A11 for maximum negative deflection.
7	.1 MFD.	High side to Pin 8 (grid) 7F8. Low side to chassis.	"	"	"	"	A12, A13	Adjust for maximum deflection. Do not repeak these adjustments after this step.
8	.1 MFD.	"	"	"	"	Output meter across voice coil	A8	Adjust for minimum output. This adjustment is critical. Turn A8 very slowly. Continue with FM RF alignment Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal 60$\sim$ modulation with 450KC sweep. Use 120$\sim$ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6	.1 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	9.1MC (freq. mod.)	FM (center position)	Tuning cap. fully closed	Vertical input to Point (A). Ground to chassis.	A9,A10, A11	Remove 2 MFD cap. from Point (A). Adjust A9, A10, & A11 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
7	.1 MFD.	High side to Pin 8 (grid) 7F8. Low side to chassis.	"	"	"	"	A12, A13	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
8	.1 MFD.	"	"	"	"	Vertical input to Point (B). Ground to chassis.	A8	Reconnect 2 MFD cap. to Point (A). Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM RF alignment Step 9.

FM RF ALIGNMENT

To check resonance of the FM coils in Steps 11, 12 & 13 use a tuning wand with a powdered iron slug at one end and a brass slug at the other. If inserting the iron slug in the coil increases the output compress the turns slightly. If the brass increases the output spread the turns slightly. When the output decreases with the insertion of either end of the coil is at resonance.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	Direct	High side to Pin 4 of FM ant. socket. Low side to chassis.	105MC	FM (center position)	5-5/32" from index mark.	DC probe to Point (A). Common to chassis	A14	Adjust for maximum deflection.
10	Direct	"	"	"	Tune for maximum deflection.	"	A15,A16	Rock tuning cap. and adjust for maximum deflection.
11	Direct	"	92MC	"	1-25/32" from index mark.	"	FM Osc. Coil (120)	Adjust for maximum per prealignment instructions
12	Direct	"	"	"	Tune for maximum deflection.	"	FM RF Coil (118)	"
13	Direct	"	"	"	"	"	FM Ant. Coil (117)	Adjust for maximum per prealignment instructions. Repeat Steps 9 through 13 until no further improvement can be made.

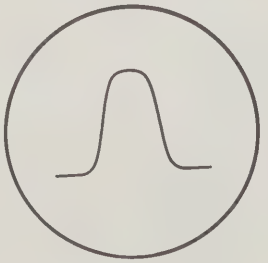
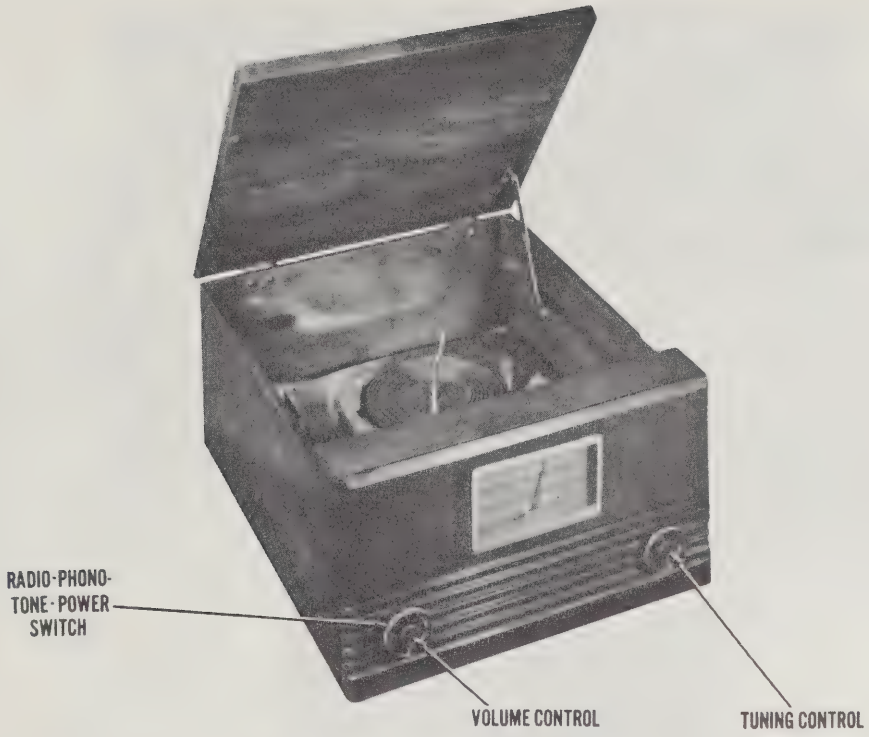


FIG. 1

FIG. 2

RADIOLA MODEL 75ZU
(Ch. RC-1063A)



RADIOLA MODEL 75ZU
(Ch. RC-1063A)

RADIOLA MODEL 75ZU

TRADE NAME	Radiola, Model 75ZU (Ch. RC-1063A)
MANUFACTURER	Radio Corporation of America, Home Instrument Div., Camden, N.J.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types,12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set lower edge of pointer to bottom edge of second "5" in the number "55".
Receiver must be in cabinet for RF alignment Steps 3 & 4.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD.	High side to Pin 4 (grid) 12SK7. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.01 MFD.	High side to rear stator of tuning cap. Low side to B-.	"	"	"	A3,A4	Adjust for maximum output. Do not repeat adjustments of A1 & A2 with sig. gen. connected as in Step 2. Install receiver in cabinet.
3	220MMFD	High side to ext. ant. lead. Low side to lug next to ext. ant. lug.	1600KC	1600KC	"	A5	Adjust for maximum output.
4		Loop	1400KC	Tune for maximum output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

RADIOLA
MODEL 75ZU

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RADIOLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RADIOLA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	80	150	72312	TA-440* UT-301	PRSA150-40-80	EZ443150C*#	DSB-8040-150	Filter-Yl. " -Red
7	.05	400	70615	TC-15	484-05	DT4S5	S-4-05	Rectifier Bypass
8	.025	400	70612	TC-13	484-025	DT4S25	S-6-03	Output Plate Bypass
9	.005	400	70606	TC-25	484-005	DT6D5	S-6-005	Audio Coupling
10	.002	400	70601	TC-22	484-002	DT4D2	S-6-002	Tone Comp.
11	.02	400	70611	TC-12	484-02	DT4S2	S-4-02	Audio Coupling
12	.002	400	70601	TC-22	484-002	DT4D2	S-6-002	Phono Tone Comp.
13	.1	400	70617	TC-1	484-.1	DT4P1	S-4-1	Phono Isolation
14	.05	400	70615	TC-15	484-05	DT4S5	S-4-05	AVC Filter
15	.005	400	70606	TC-25	484-005	DT6D5	S-6-005	Ext. Ant. Isolation
16	.1	400	70617	TC-1	484-.1	DT4P1	S-4-1	Line Isolation
17	820	300	39650	1FM-37	1468-00075	1W5T8	MO.3-38	AF Plate Bypass
18	5.6	500	70997					Fixed Trimmer-Cer.

*Parallel sections to obtain desired capacity.
#Omit bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RADIOLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	500KΩ	½	73057	D13-133‡	M-60-Z‡	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 19A per instructions

‡Install a 47KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft side, terminals down.)

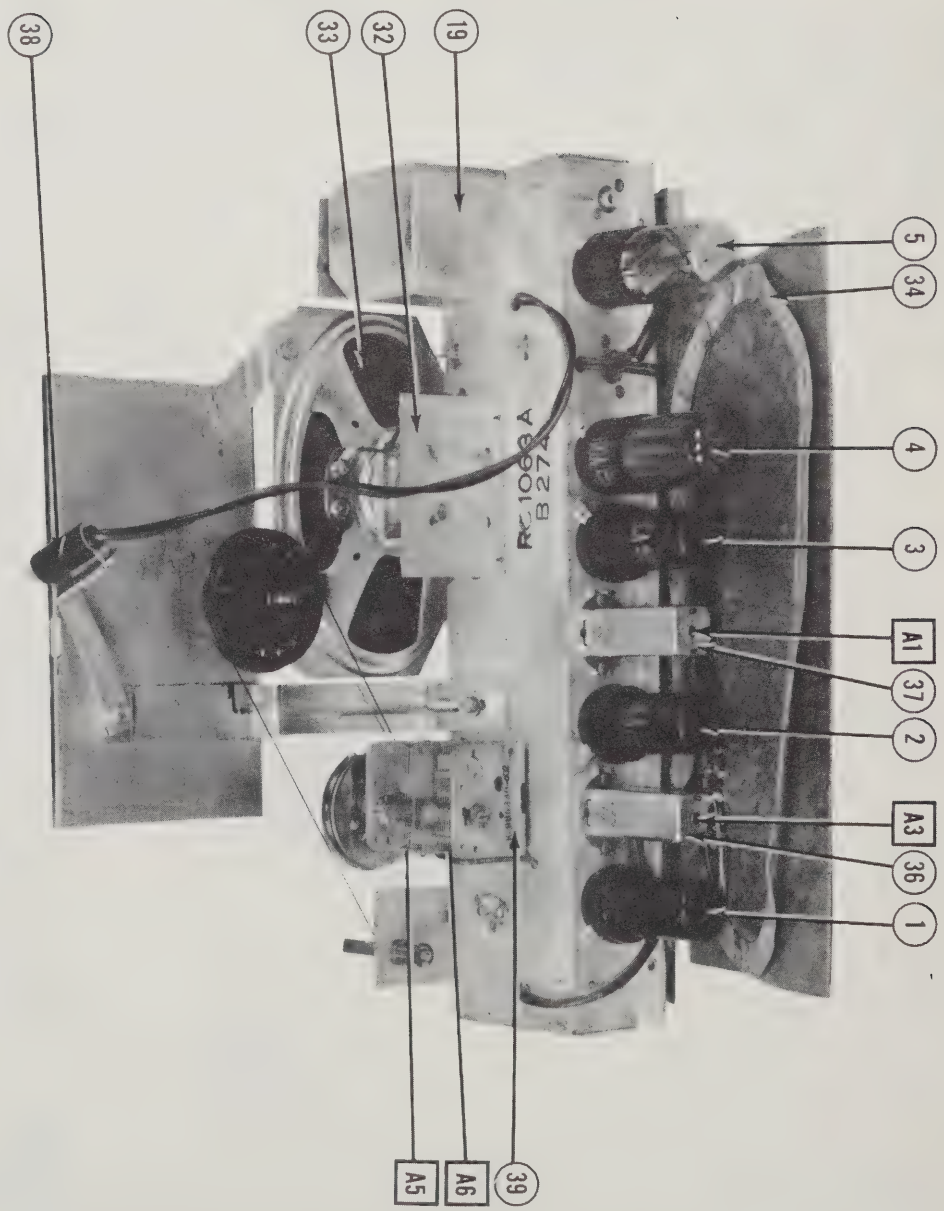
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RADIOLA PART No.	IRC PART No.	IDENTIFICATION CODES
20	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation
21	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
22	270KΩ	½		BTS-270K	Red-Vi.-Yl. Phono Shunt
23	33KΩ	½		BTS-33K	Or.-Or.-Or. Diode RF Filter
24	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
25	5.6 Meg.	½		BTS-5.6 Meg.	Grn.-Blue-Grn. AF Grid
26	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
27	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
28	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
29	1200Ω	1		BTA-1200	Br.-Red-Red Filter
30	33Ω	½		BW-½-33	Surge Limiter

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RADIOLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
31	1850Ω	3.8Ω	211Ω tapped @ 11Ω	.5Ω	72296	A-3876**		A-2928**	**Drill new mounting holes. Add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: RADIOLA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
32	PM	3.8Ω	71058		46A1†	†Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
33	4"x6"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

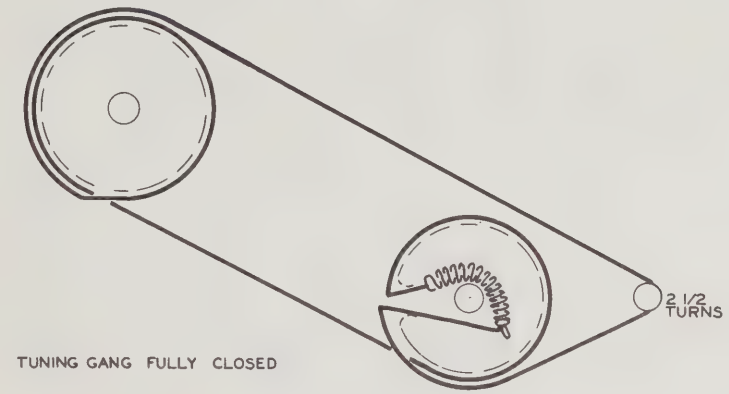
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RADIOLA PART No.	MEISSNER PART No.	
34	Loop Ant.	.1Ω	1.2Ω	73010		
35	Osc. Coil	1Ω	8Ω	70403	14-1060§	§Add 50MMFD from osc. grid to high side tuning cap.
36	Input IF	18Ω	13Ω	73036	16-6678	
37	Output IF	15Ω	15Ω	73037	16-6678††	††Add 150MMFD from bottom of sec. to B--.

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: RADIOLA PART No.		INSTALLATION NOTES
38	Bayonet	7.5	0.2	White	11765		Type 51

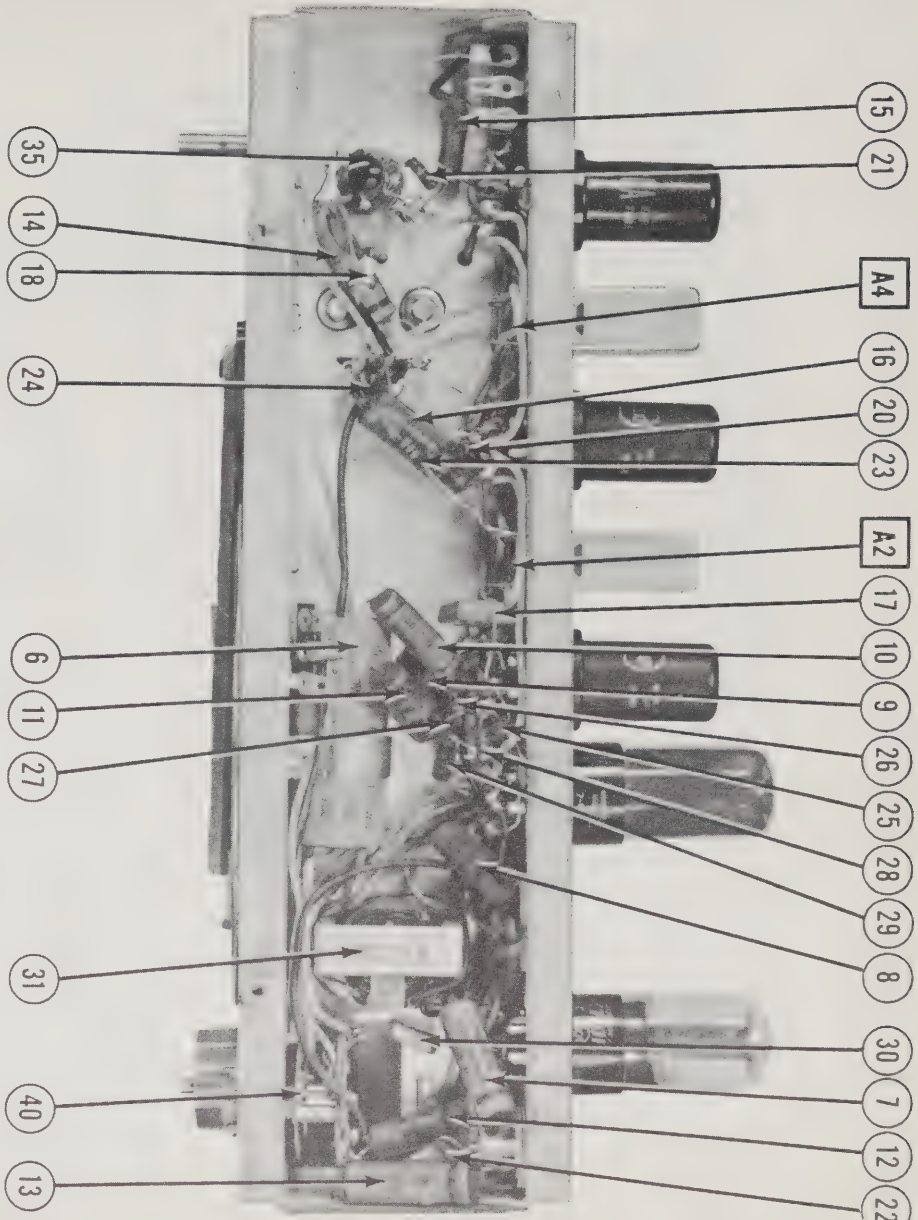
MISCELLANEOUS

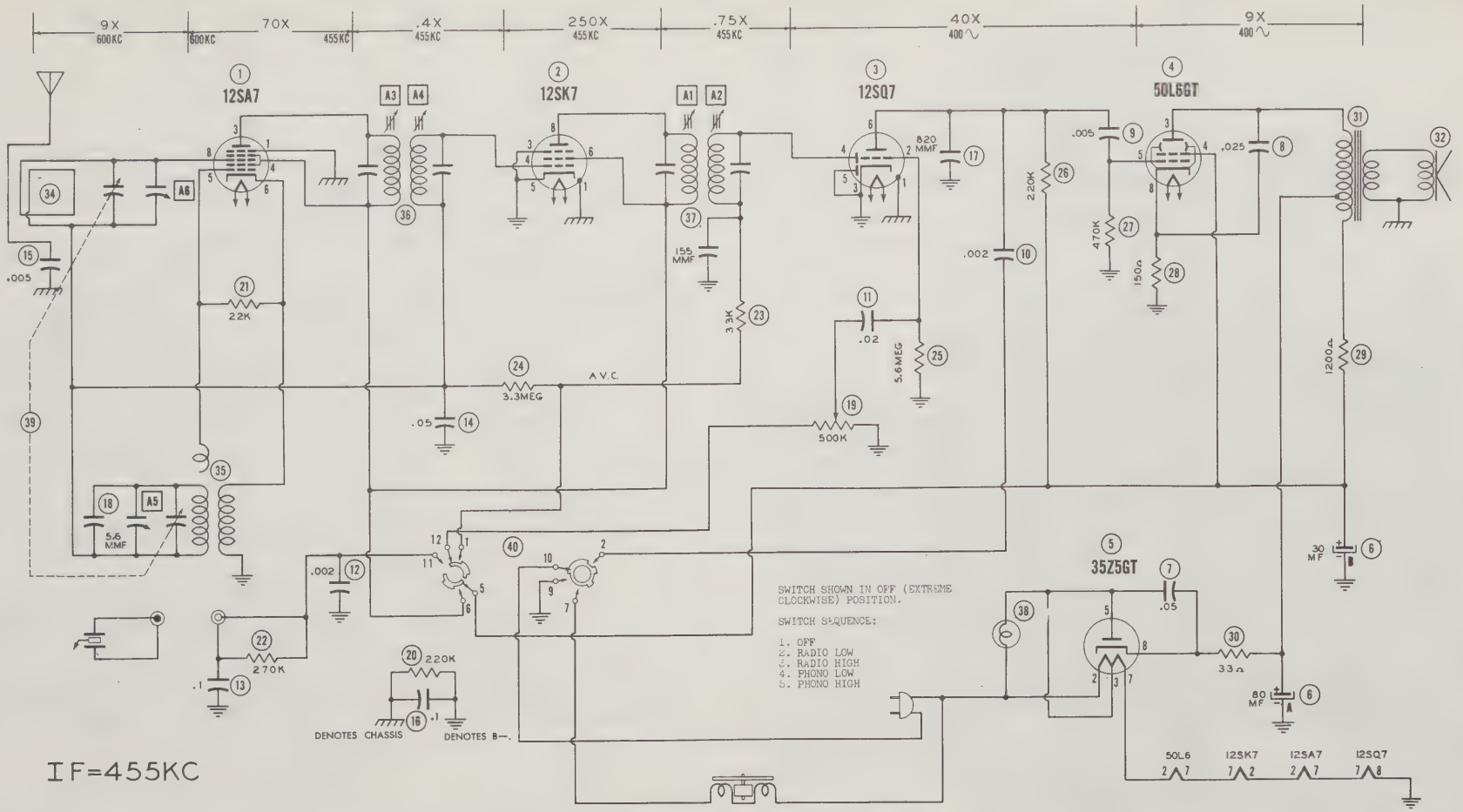
ITEM No.	PART NAME	RADIOLA PART No.	NOTES
39	2 Gang Var. Cap	73056	(22-500MMF, 18-148MMF)
	Switch	70394	Radio-Phono-Tone
	Dial Pointer	73059	
	Dial Scale	73063	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	25VAC	85VDC	85VDC	-11VDC§	0V.	12VAC	-.8VDC
2	12SK7	0V.	.25VAC	0V.	-.8VDC	0V.	85VDC	39VAC	85VDC
3	12SQ7	0V.	-.4VDC	0V.	-.3VDC	0V.	60VDC	12VAC	0V.
4	50L6GT	0V.	86VAC	110VDC	85VDC	0V.	116VDC	39VAC	5.5VDC
5	35Z5GT	0V.	117VAC	115VAC	0V.	115VAC	117VAC	86VAC	118VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	25Ω	150KΩ	150KΩ	22KΩ	1Ω	13Ω	3.8 Meg
2	12SK7	220KΩ	25Ω	0Ω	3.8 Meg.	0Ω	150KΩ	38Ω	150KΩ
3	12SQ7	220KΩ	5.6 Meg.	0Ω	530KΩ	0Ω	770KΩ	13Ω	0Ω
4	50L6GT	220KΩ	86Ω	150KΩ	150KΩ	470KΩ	150KΩ	38Ω	140Ω
5	35Z5GT	INF.	115Ω	110Ω	INF.	110Ω	115Ω	86Ω	150KΩ

RADIO-PHONO SWITCH IN RADIO POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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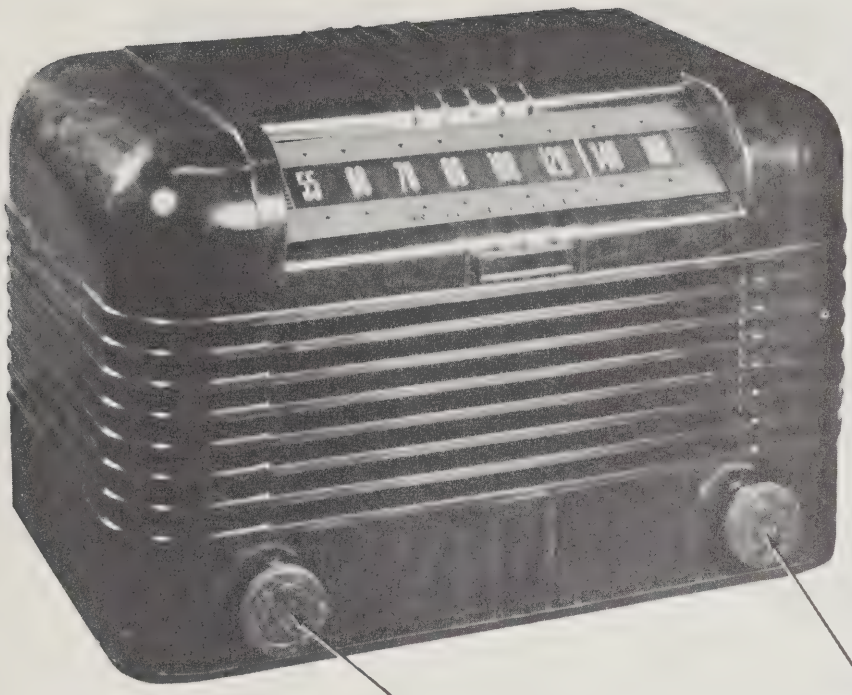
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

RADIOLA MODELS 76ZX11, 76ZX12, (Ch. RC-1058, RC-1058A)

RADIOLA MODELS 76ZX11, 76ZX12, (Ch. RC-1058, RC-1058A)



RADIOLA MODELS 76ZX11, 76ZX12, (Ch. RC-1058, RC-1058A)

RADIOLA MODEL 76ZX11

TRADE NAME	Radiola, Model 76ZX11, 76ZX12 (Ch. RC-1058, RC-1058A)
MANUFACTURER	Radio Corporation of America, Home Instrument Div., Camden, N.J.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SG7 Mixer, 12J5GT Osc., 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 1-13/16" from left edge of dial backplate.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.01 MFD	"	"	"	"	A3,A4	Adjust for maximum output.
3	200MMFD	High side to ext. ant. lead. Low side to B-.	1600KC	"	"	A5	" " " "
4	200MMFD	"	1300KC	Tune for maximum output.	"	A6	" " " "
5	200MMFD	"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4, 5 until no further improvement can be made.

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DATE 3/48-#486-20 SET #36-FOLDER #20

PARTS LIST AND DESCRIPTIONS

RADIOLA MODEL 76ZX11

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RADIOLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mixer	12SG7	12SG7	8BK	
2	Osc.	12J5GT	12J5GT	6Q	
3	IF Amp.	12SK7	12SK7	8N	
4	Det.-AVC-AF	12SQ7	12SQ7	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RADIOLA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	150	39152	TA-530	PRSA150-30-50	EDL5315	DSB-5030-150	Filter-Grn.
B	50	150						" -Red
8	.05	400	70615	TC-15	484-05	DT4S5	S-4-05	Rectifier Bypass
9	.02	400		TC-12	484-02	DT4S2	S-4-02	Output Plate Bypass
10	.005	400	70606	TC-25	484-005	DT4D5	S-6-005	Audio Coupling
11	.02	400		TC-12	484-02	DT4S2	S-4-02	" "
12	.05	400	70615	TC-15	484-05	DT4S5	S-4-05	AVC Filter
13	.01	400	70610	TC-11	484-01	DT4S1	S-4-01	Mixer Decoupling
14	.01	400	70610	TC-11	484-01	DT4S1	S-4-01	Mixer Cathode Bypass
15	.01	400	70610	TC-11	484-01	DT4S1	S-4-01	Ext. Ant. Isolation
16	.1	400	70617	TC-1	484-1	DT4P1	S-4-1	Line Isolation
17	330		72571	1FM-335	1468-00035	5W5T3	M0.5-33	AF Plate Bypass
18	56		73172	1FM-45	1468-00005	5W5Q5	M0.5-45	Osc. Grid Cap.-See Note

Note-Used in chassis RC-1058A.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RADIOLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	500KΩ	½	36410	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 19A per instructions
C	Switch		" "	41	SW-A	" " " " "

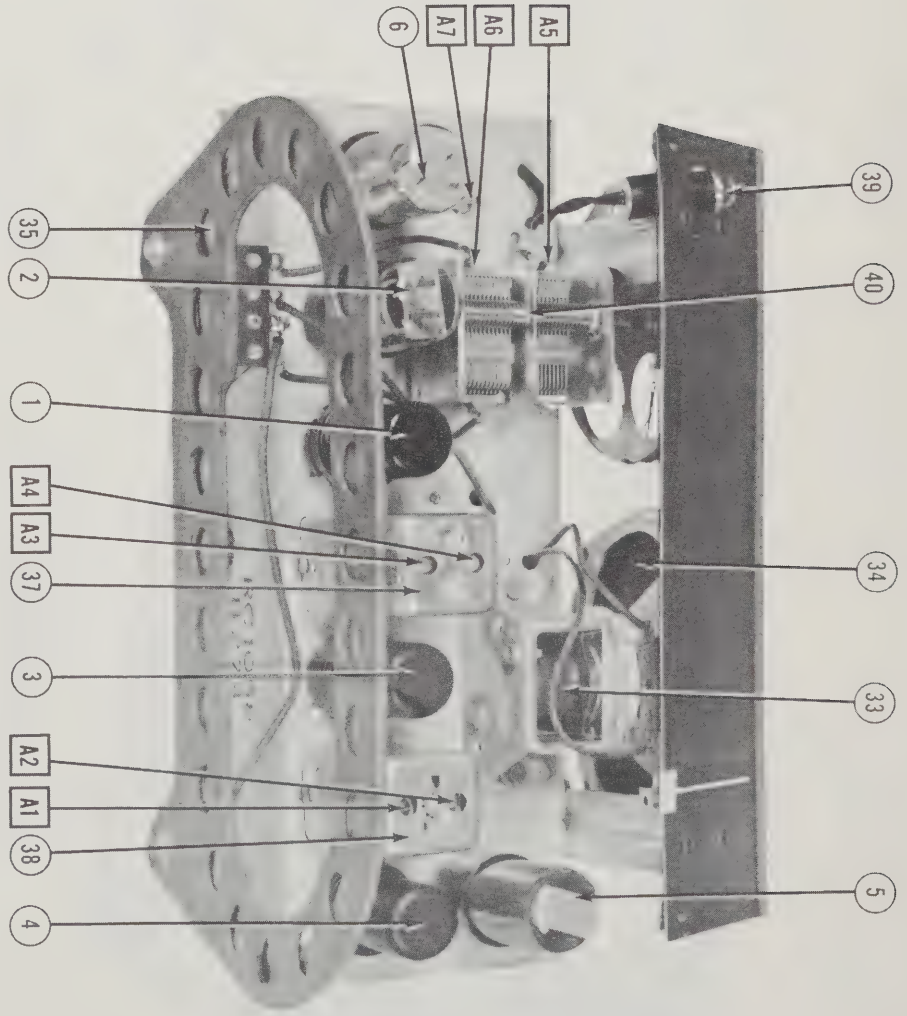
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RADIOLA PART No.	IRC PART No.	IDENTIFICATION CODES
20	3300Ω	½		BTS-3300	Or.-Or.-Red Converter Cathode
21	1500Ω	½		BTS-1500	Br.-Grn.-Red Converter Decoupling
22	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
23	3.3 Meg.	½		BTS-3.3 Meg	Or.-Or.-Grn. AVC Network
24	47KΩ	½		BTS-47K	Yl.-Vl.-Or. Diode RF Filter
25	4.7 Meg.	½		BTS-4.7 Meg	Yl.-Vl.-Grn. AF Grid
26	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
27	470KΩ	½		BTS-470K	Yl.-Vl.-Yl. Output Grid
28	120Ω	1		BW-1-120	Br.-Red-Br. Output Cathode
29	1200Ω	½		BTS-1200	Br.-Red-Red Filter
30	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation
31	120Ω	½		BW-½-120	Br.-Red-Br. IF Cathode

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RADIOLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
32	2400Ω	3.7Ω	235Ω tapped @ 15Ω	.86Ω	36800	A-3876*		A-2928*	*Drill new mounting holes. Add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: RADIOLA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105†	5A1†	†Drill and tap magnet frame.
33	PM	3.7Ω	72201	Mod. P5-X		
	CONE DIA.	VC DIA.				
34	4½"	½"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

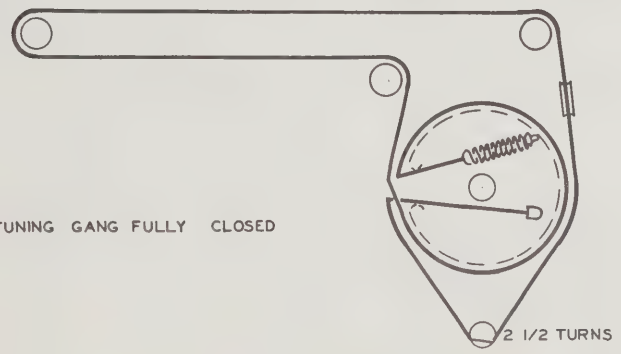
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RADIOLA PART No.	MEISSNER PART No.
35	Loop Ant.	.1Ω	1.3Ω	73030	
36A	Osc. Coil	1Ω	4Ω	730704	
B	" "			73163	
37	Input IF	10Ω	10Ω	70411	16-6658
38	Output IF	16Ω		70412	16-6670

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: RADIOLA PART No.		INSTALLATION NOTES
39	Bayonet	7.5	0.2	White	11765		Type 51

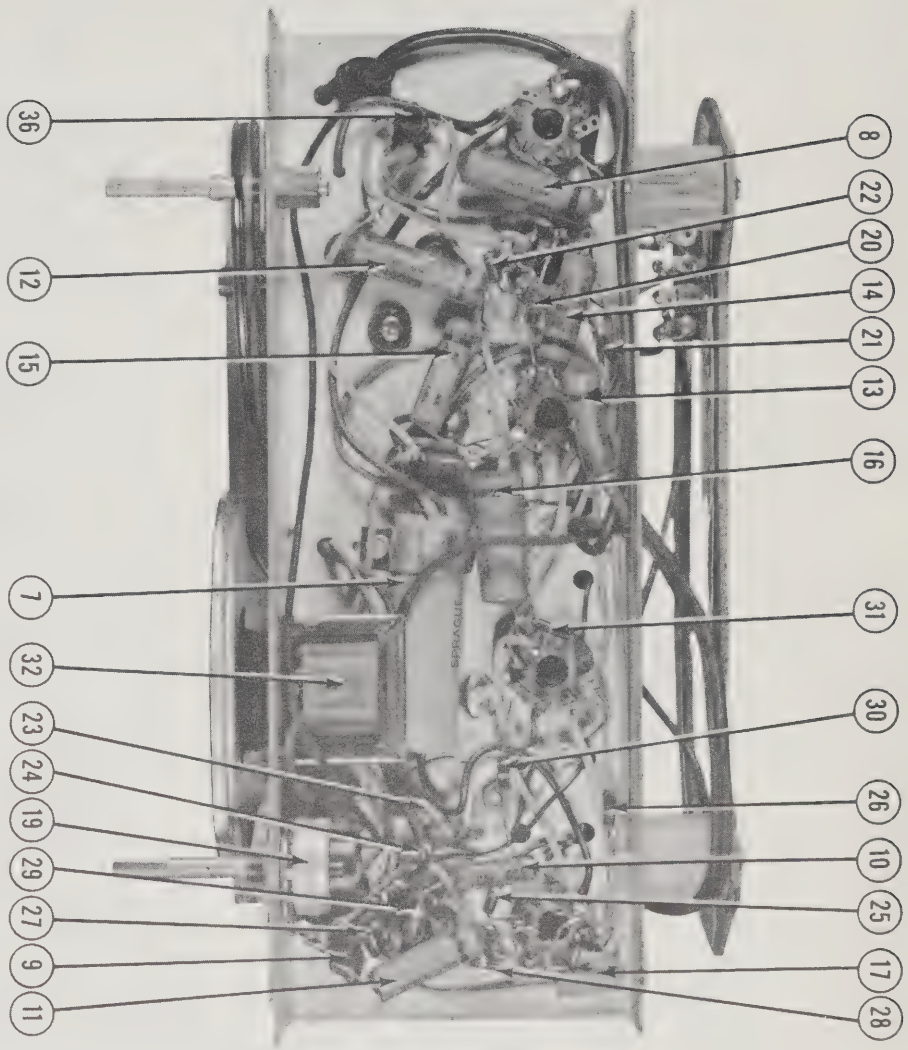
MISCELLANEOUS

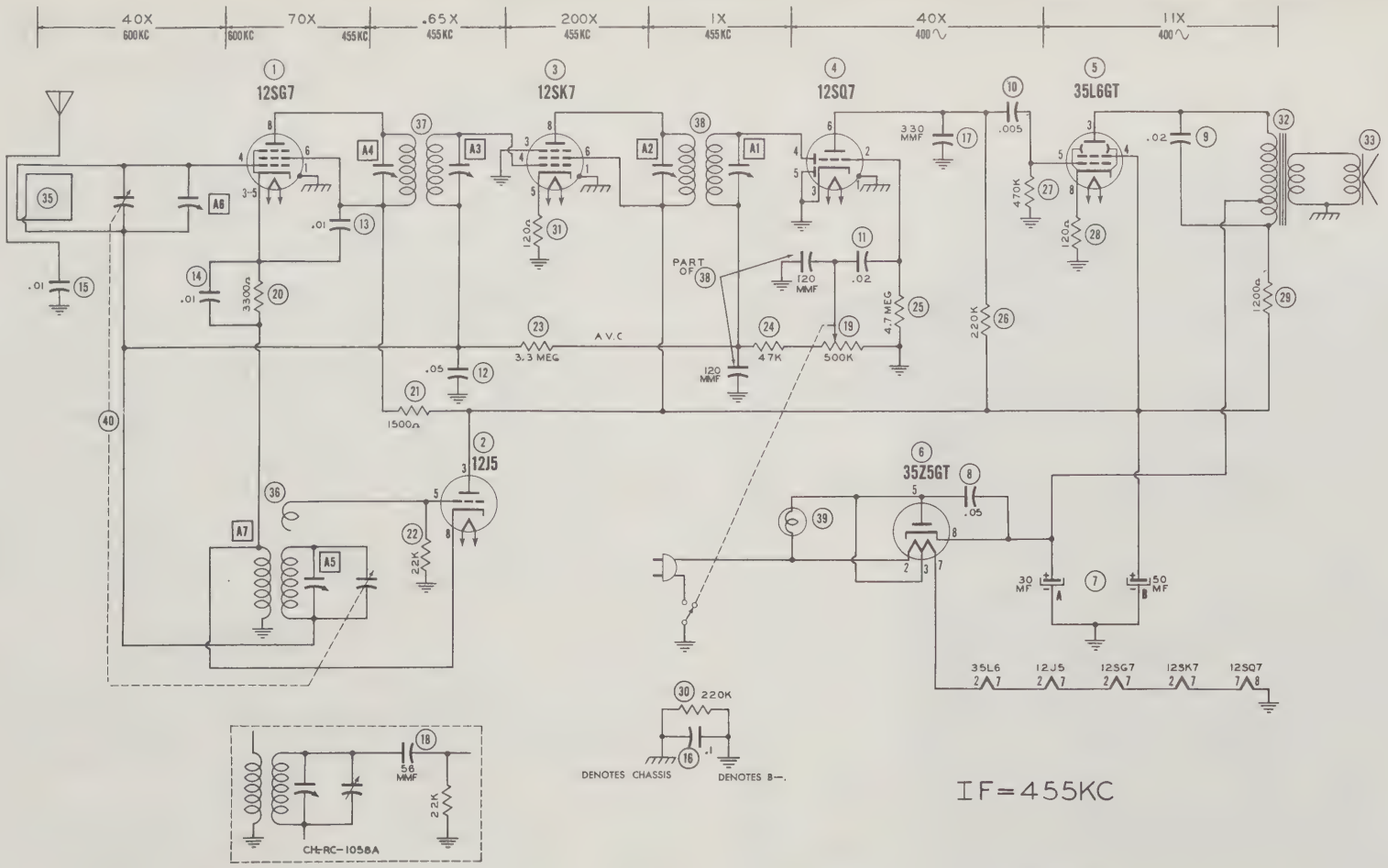
ITEM No.	PART NAME	RADIOLA PART No.	NOTES
40A	2 Gang Var. Cap.	72091	(24-416MMF, 22-152MMF)(Ch. RC-1058)
B	" " " "	73171	(Ch. PC-1058A)
	Dial Scale	72903	Glass
	Dial Pointer	37068	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





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VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SQ7	0V.	38VAC	5.5VDC	0V.	5.5VDC	5VDC	25VAC	95VDC
2	12J5GT	0V.	51VAC	97VDC	0V.	-6VDC§	0V.	38VAC	0V.
3	12SK7	0V.	25VAC	0V.	0V.	1.6VDC	97VDC	12VAC	97VDC
4	12SQ7	0V.	-.6VDC	0V.	-.4VDC	0V.	62VDC	12VAC	0V.
5	35L6GT	0V.	86VAC	117VDC	97VDC	0V.	125VDC	51VAC	5VDC
6	35Z5GT	0V.	117VAC	114VAC	0V.	114VAC	0V.	86VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SQ7	220KΩ	37Ω	3.3KΩ	4 Meg.	3.3KΩ	202KΩ	25Ω	202KΩ
2	12J5GT	INF.	50Ω	200KΩ	0Ω	22KΩ	0Ω	37Ω	1.5Ω
3	12SK7	220KΩ	25Ω	0Ω	4 Meg.	120Ω	200KΩ	13Ω	200KΩ
4	12SQ7	550KΩ	4.7 Meg.	0Ω	550KΩ	0Ω	420KΩ	13Ω	0Ω
5	35L6GT	INF.	85Ω	200KΩ	200KΩ	470KΩ	200KΩ	50Ω	120Ω
6	35Z5GT	INF.	115Ω	110Ω	INF.	110Ω	INF.	85Ω	200KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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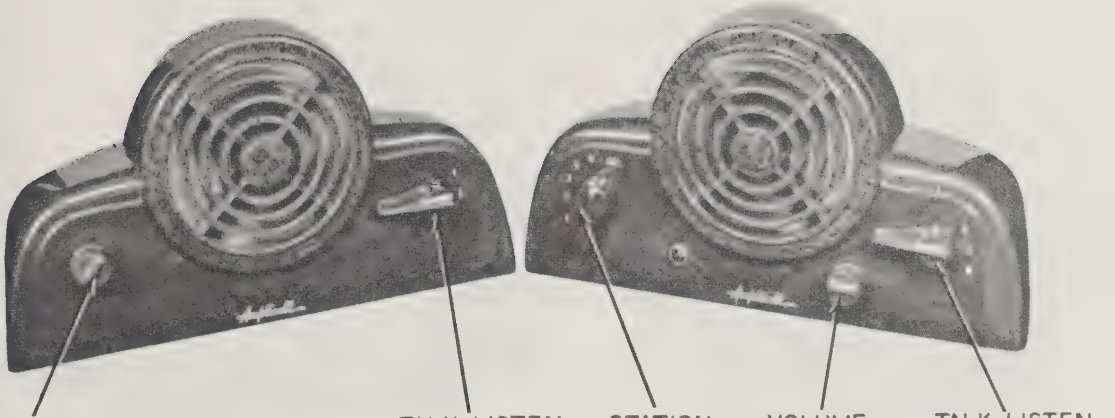
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RAULAND (AMPLICALL) MODELS 2105 (Master Station), 2100-S (Sub-Station)

RAULAND (AMPLICALL) MODELS 2105 (Master Station), 2100-S (Sub-Station)



RAULAND (AMPLICALL) MODELS 2105 (Master Station), 2100-S (Sub-Station)

TRADE NAME	Rauland (Amplicall), Model 2105 (Master Station), 2100-S (Sub-Station)
MANUFACTURER	Rauland Corp., 4245 N. Knox Ave., Chicago 41, Ill.
TYPE SET	AC-DC Operated Inter-communication System
TUBES (THREE)	Types, 12AU6 AF Amp., 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC RATING .21 Amp. @ 117 Volts AC

VOLTAGE AND RESISTANCE READINGS TAKEN WITH STATION SELECTOR SWITCH IN "ALL" POSITION.
TALK-LISTEN SWITCH IN LISTEN POSITION.
REMOTE UNITS NOT CONNECTED.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12AU6	0V.	1VDC	12VAC	0V.	36VDC	15VDC	1VDC
2	50B5	0V.	7VDC	65VAC	12VAC	105VDC	102VDC	0V.
3	35W4	0V.	0V.	82VAC	117VAC	114VAC	114VAC	125VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12AU6	560Ω	7KΩ	10Ω	0Ω	590KΩ	340KΩ	7KΩ
2	50B5	100KΩ	170Ω	60Ω	10Ω	120KΩ	120KΩ	100KΩ
3	35W4	INF.	0Ω	180Ω	210Ω	208Ω	208Ω	120KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAULAND PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AF Amp.	12AU6	12AU6	7BK	
2	Power Output	50B5	50B5	7BZ	
3	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAULAND PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
4A	30	150	CE-806F	TA-330	PRSA40302	EZ4215C	DSB-303	Filter - Red
B	30	150						" - Red
C	20	25		TA-25				Cathode Bypass-Blue
5A	20	150	CE-406L	UT-201	PRSA1502020	EZ2215	DSB-2x20-150	Filter - Red
B	20	25		TA-25				Cathode Bypass-Or.
6	.05	600		TC-15	684-05	DT6S5	S-6-05	Line Isolation
7	.05	600		TC-15	684-05	DT6S5	S-6-05	AF Screen Bypass
8	200	500		1FM-32	1468-0002	5W5T2	MO.5-32	Audio Coupling
9	200	500		1FM-32	1468-0002	5W5T2	MO.5-32	Transformer Shunt

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAULAND PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
10A	500KΩ	½	RP-504Y	D13-133	AM-60-Z	Master Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 10A per instructions
C	Switch		" "	41	SW-A	" " " "
11A	500Ω	½	RP-501A	D11-103	AM-5-S	Sub. Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 11A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAULAND PART No.	IRC PART No.	IDENTIFICATION CODES
12	30Ω	½		BW-½-33	Or.-Blk.-Blk. Input Shunt
13	7500Ω	½		BTS-6800	Vi.-Grn.-Red AF Cathode
14	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AF Screen Dropping
15	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
16	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Output Grid
17	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
18	1500Ω	½		BTS-1500	Br.-Grn.-Red Filter
19	470Ω	1		BTA-470	Yl.-Vi.-Br. "
20	15Ω	½		BW-½-15	Br.-Grn.-Blk. Surge Limiter
21	130Ω	5		ABA-150	Line Dropping-See Note
22	200Ω	½		BW-½-220	Red-Blk.-Br. Input Shunt
23	68Ω	½		BW-½-68	Blue-Gray-Blk. Series Input

Note-On IRC replacement set slider at 130Ω from one end.

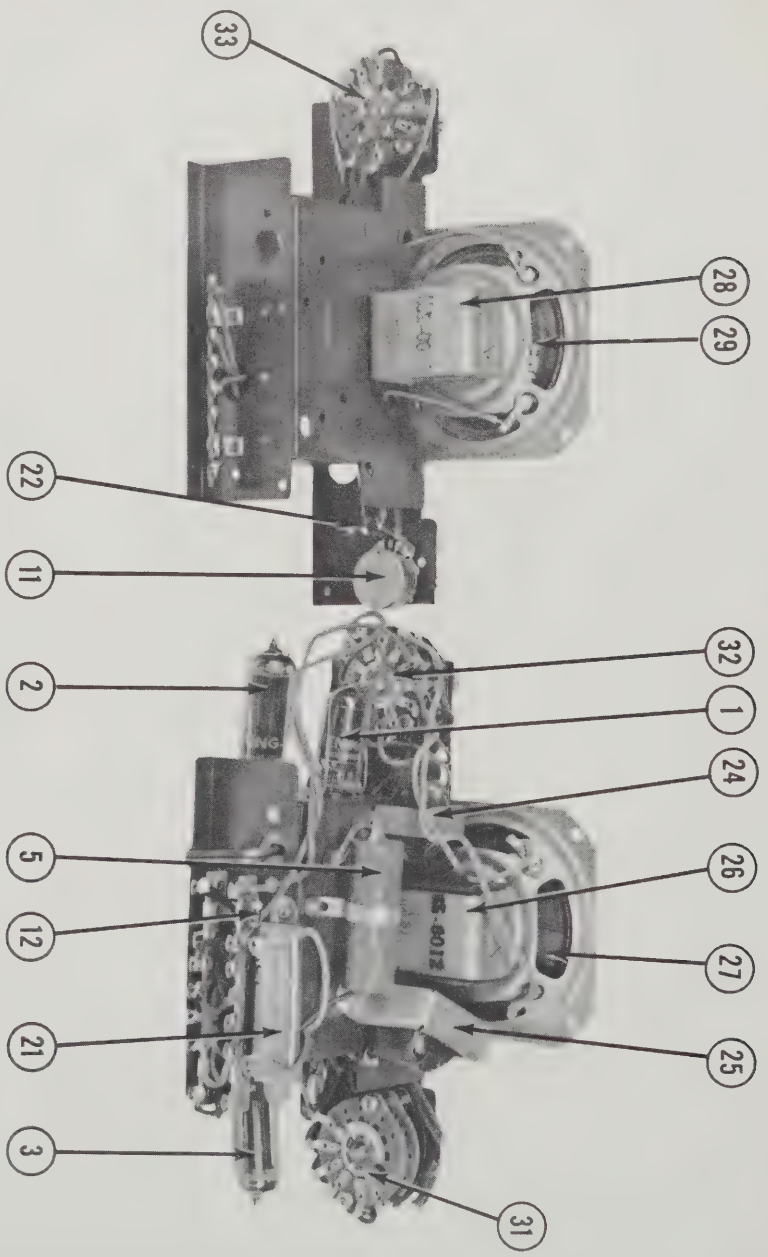
TRANSFORMER (INPUT)

ITEM No.	RATING: TURNS RATIO PRI. to SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RAULAND PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
24	1 to 15	7Ω CT	560Ω	LA-0043	A-4708*	T20A00*		*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RAULAND PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
25	1400Ω	50Ω	55Ω	4.1Ω	LO-0056			A-2902	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: RAULAND PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
26	FIELD PM	VC IMP. 50Ω	US-0012			
27	CONE DIA. 3-3/8"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			
28	FIELD PM	VC IMP. 50Ω	US-0012			
29	CONE DIA. 3-3/8"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: RAULAND PART No.		INSTALLATION NOTES
30	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
31	Switch	X-0212	Station Selector
32	"	X-0211	Talk-Listen-Reset
33	"	X-0210	Talk-Listen-Call

DESCRIPTION OF EQUIPMENT

The Rauland 2105 Master Amplicall is designed for use in a system consisting of ONE Master station operated in comjunction with one or more Remote stations with a maximum of 5 Remote stations.

The 2105 Master selector switch includes an "ALL CALL" position allowing paging of all 5 Remote stations simultaneously.

Any Remote station equipped with originating switch may originate a direct voice call to the Master station. When the Master station calls any type of Remote station the Remote can reply without operating any control. Remote stations cannot inter-communicate with each other.

CONNECTING 2105 MASTER

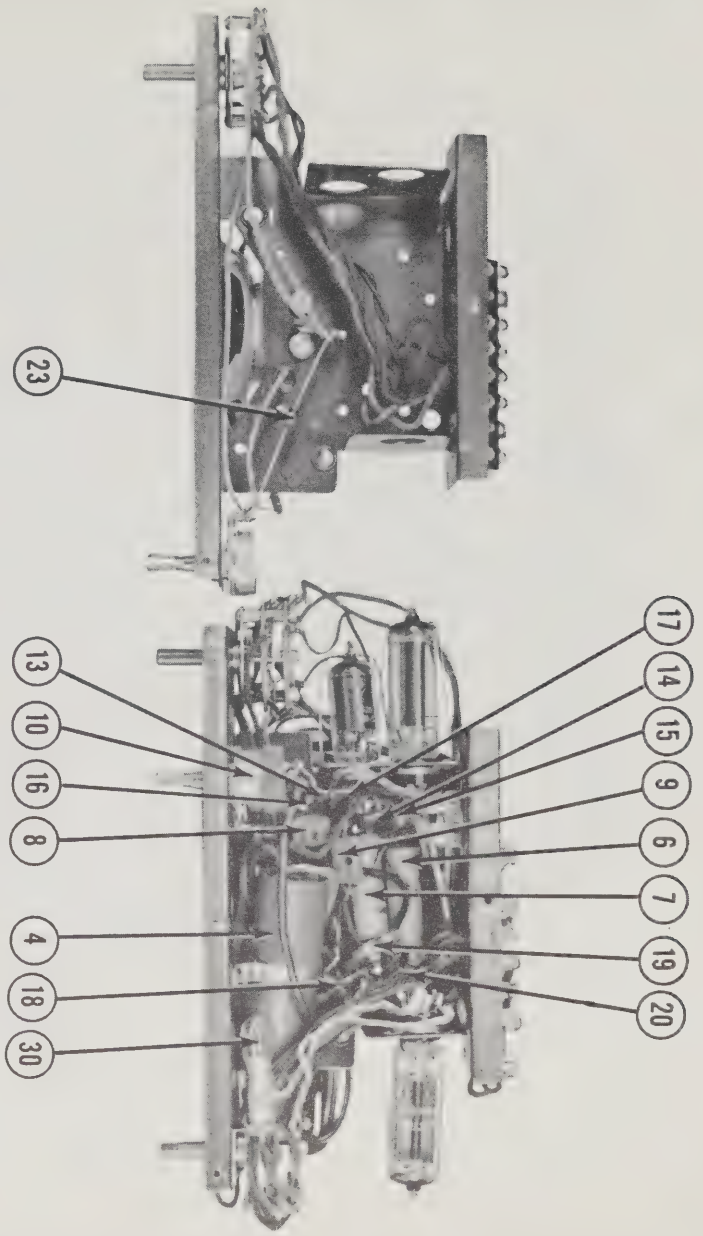
To wire the 2105 Master station it is necessary to remove the unit from its case.

A one pair cable from type 2100S Remote stations that are not permitted to originate a call should be connected to the pair of terminals corresponding to the number of the remote station to which this one-pair cable is connected.

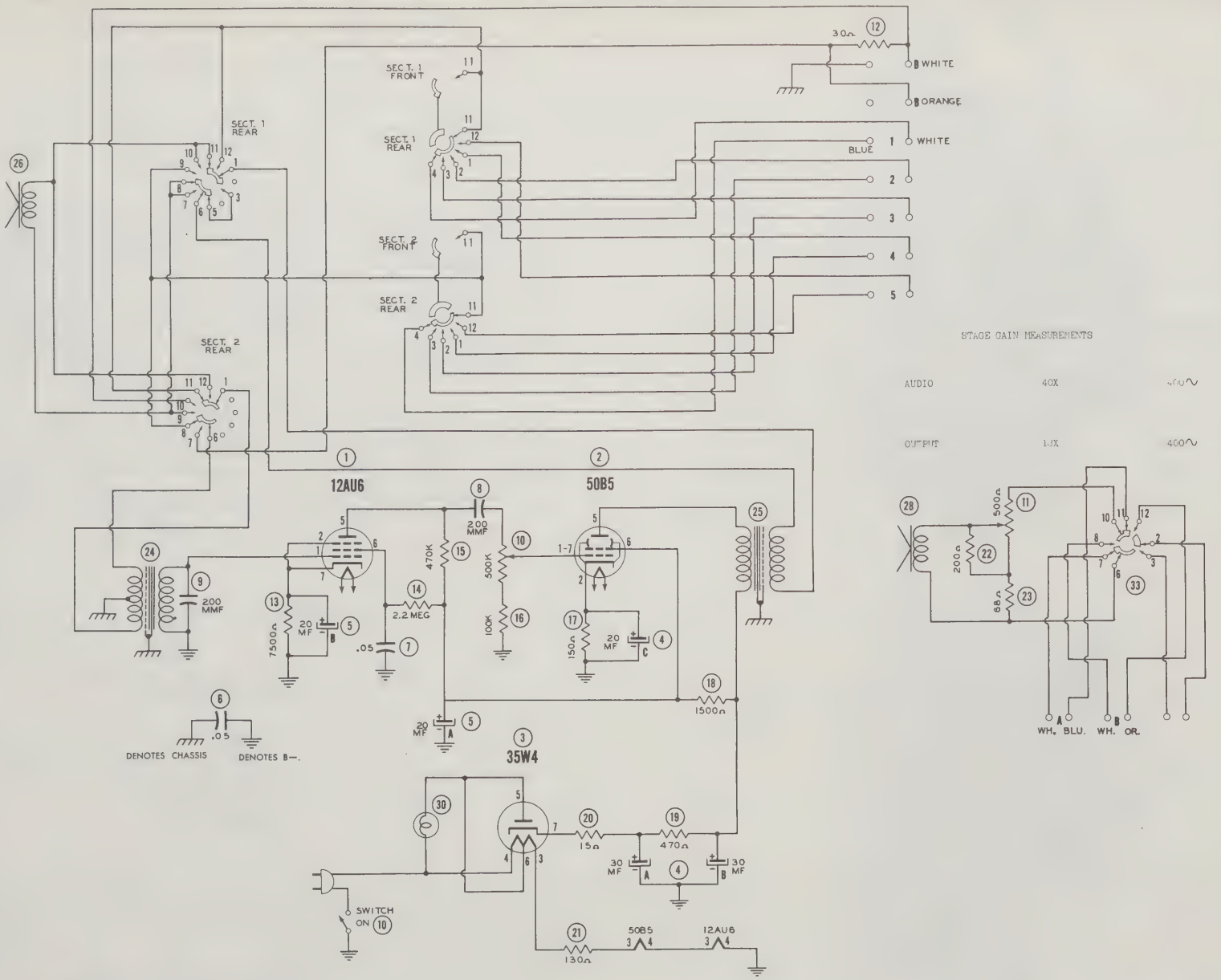
A two-pair cable from 2100S Remote stations and type 2300 with 2302S Origination Switch should be connected as follows:

1. BLUE-WHITE
   The blue-white pair should be connected to the pair of terminals corresponding to the number of Remote station.
2. ORANGE-WHITE
   The orange-white pair should be connected to the tie lugs marked "B" - "B". Regardless of the number of orange-white pairs they are all connected to tie lugs "B" - "B".

CHASSIS—BOTTOM VIEW



RAULAND (AMPLICALL)
MODELS 2105, 2100-S



STAGE GAIN MEASUREMENTS

AUDIO	40X	400~
OUTPUT	1.3X	400~

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SONORA MODEL
WCU-246

SONORA MODEL
WCU-246

SONORA MODEL WCU-246

TRADE NAME	Sonora, Model WCU-246
MANUFACTURER	Sonora Radio & Tele. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Bed Lamp Attachment
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	535-1620KC RATING .43 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to left stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	100MMFD	High side to ext. ant. lead. Low side to B-.	1620KC	"	"	A4	Adjust for maximum output. Trimmer opposite A4 is a factory adjustment and ordinarily need not be changed.
3	100MMFD	"	1400KC	Tune for maximum output.	"	A5	"

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PARTS LIST AND DESCRIPTIONS

SONORA MODEL WCU-246

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SONORA PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	35L6GT	35L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SONORA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	60	150	N-6236	TA-530	PRSA150-30-50	EDL5315	DSB-5030-150	Filter - Blue
B	20	150						" - Red
7	.05	400	N-1348	TC-15	464-05	DT4S5	MPH-4-05	Rectifier Bypass
8	.02	400	N-1376	TC-12	484-02	DT4S2	S-4-02	Output Plate Bypass
9	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
10	.1	200	N-1361	TC-1	484-.1	DT2P1	S-2-1	AF Plate Bypass
11	.005	600	N-4894	TC-25	664-005	DT6D5	S-6-005	Audio Coupling
12	.05	200	N-1345	TC-15	484-05	DT2S5	S-4-05	Line Isolation
13	.05	200	N-1345	TC-15	484-05	DT2S5	S-4-05	AVC Filter
14	.05	200	N-1345	TC-15	464-05	DT2S5	S-4-05	Tuning Cap. Isolation
15	250	500	N-6135	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass-Cer.
16	100	500	N-6015	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter-Cer.

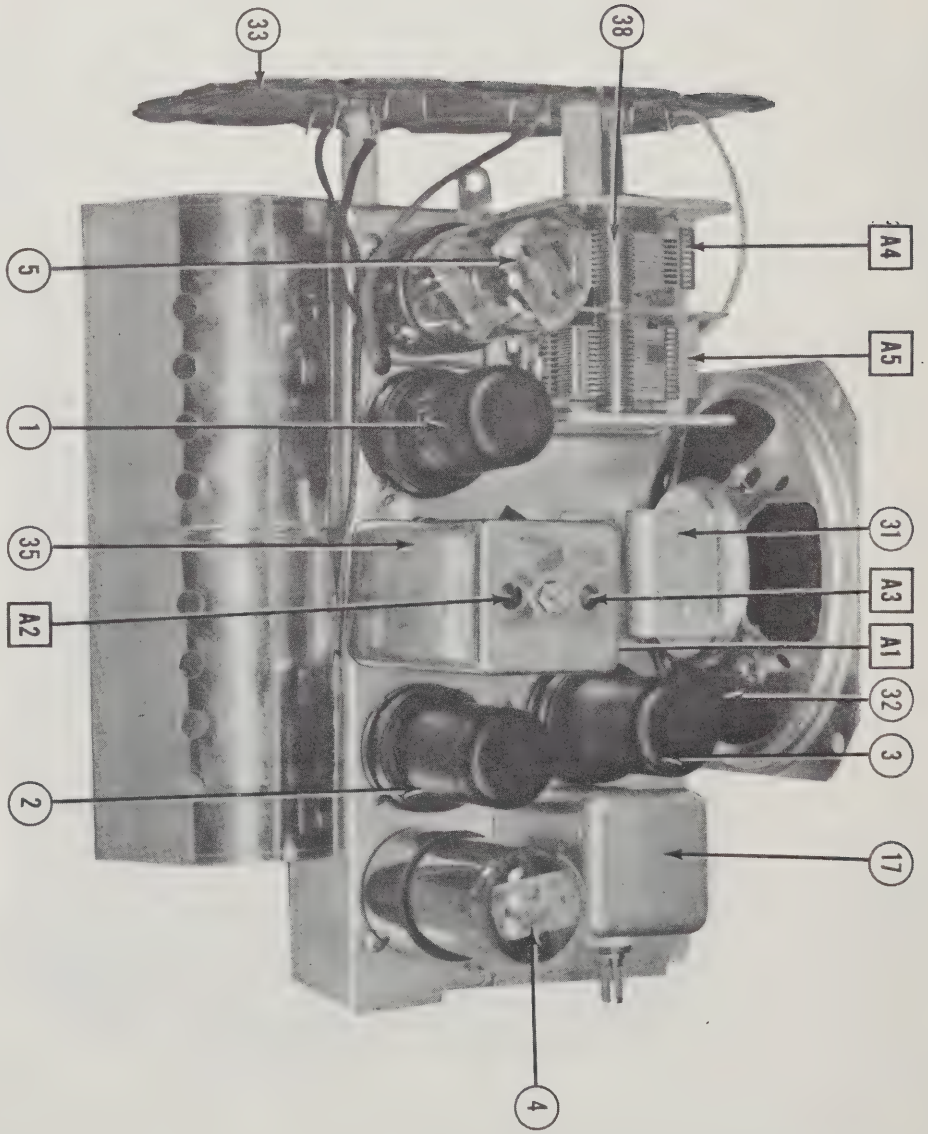
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	500KΩ	½	N-6239	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KS8-3	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	
18	22KΩ	½	N-4025	BTS-22K	Red-Red-Or. Oscillator Grid
19	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. Line Isolation
20	1 Meg.	½	N-1282	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
21	47KΩ	½	N-4083	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
22	6.8 Meg.	½	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
23	150KΩ	½	N-1779	BTS-150K	Br.-Grn.-Yl. AF Plate Load
24	47KΩ	½	N-4083	BTS-47K	Yl.-Vi.-Or. AF Plate Decoupling
25	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl. Output Grid
26	220Ω	½	N-4024	BW-½-220	Red-Red-Br. Output Cathode
27	1200Ω	1	N-4900	BTA-1200	Br.-Red-Red Filter
28	47Ω	1	N-4256	BW-1-47	Yl.-Vi.-Blk. Surge Limiter
29	68Ω	2	N-6014	BW-2-68	Blue-Gray-Blk. Line Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SONORA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
30	3000Ω	3.0Ω	300Ω	.6Ω	N-3899	A-3876*	T22S45*	A-2998	*Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SONORA PART No.	JENSEN PART No.	QUAM PART No.	
31	FIELD PM	VC IMP. 3.0Ω	N-6235		4A07†	†Drill new mounting holes..
32	CONE DIA. 4"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

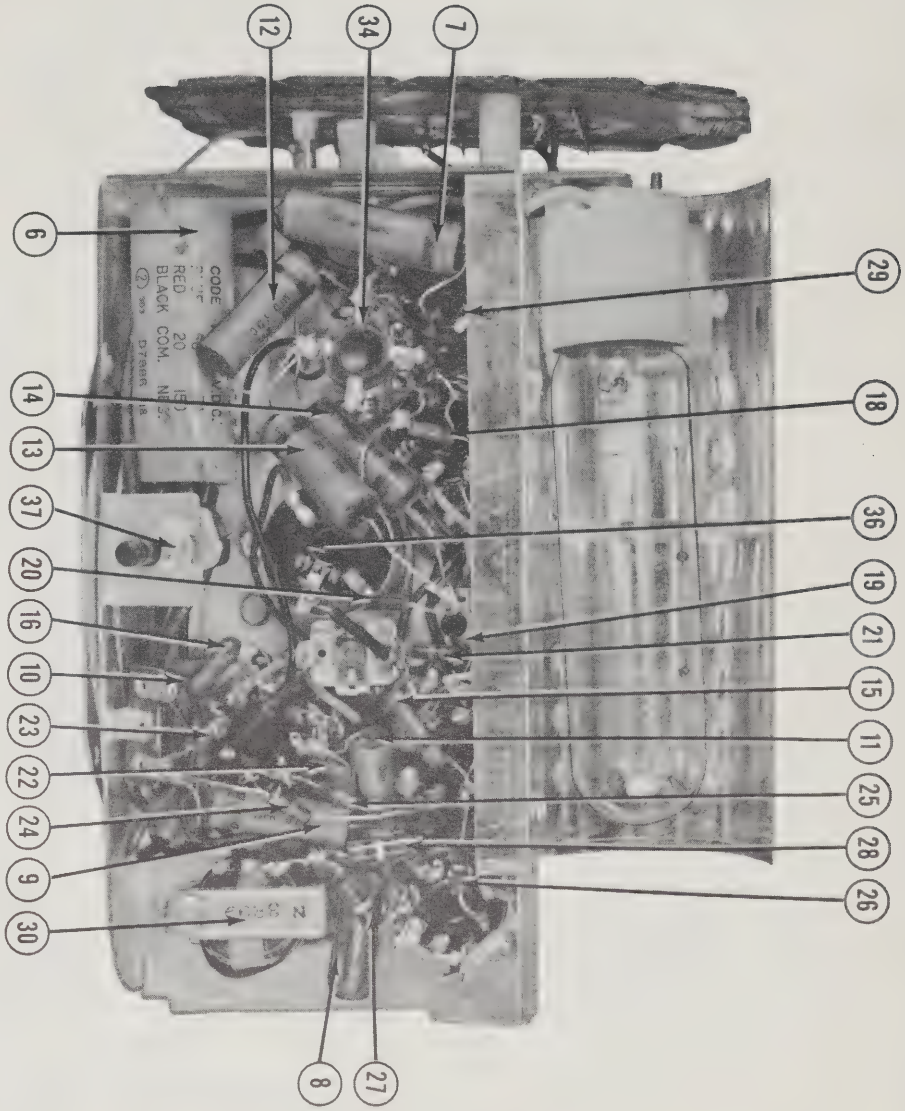
R F COILS

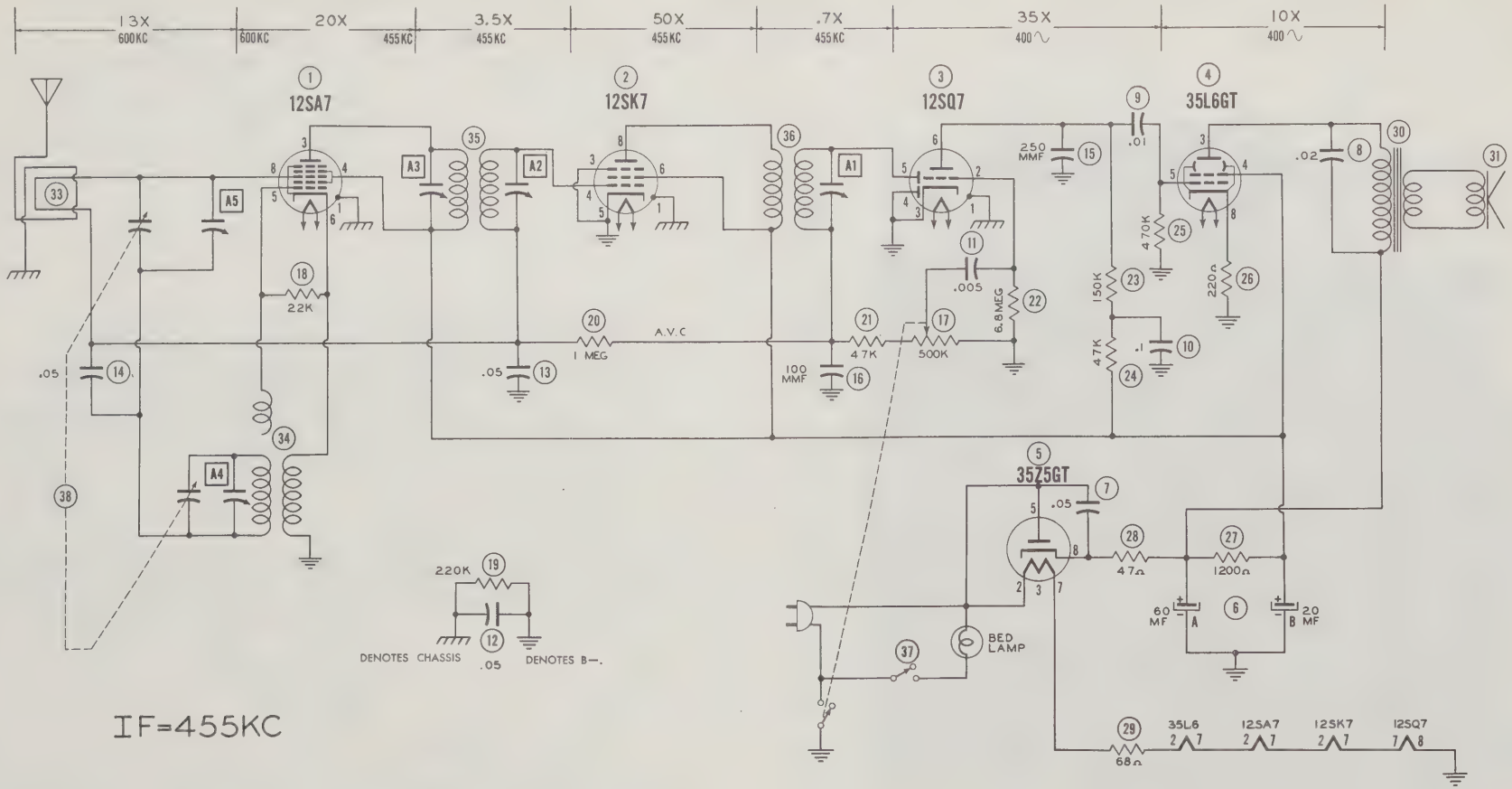
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	
33	Loop Ant.	.5Ω	4.8Ω	N-3536		
34	Osc. Coil	.8Ω	6.1Ω	N-4810	14-1040‡	‡Add 50MMFD from osc. grid to high side tuning cap.
35	Input IF	12.5Ω	14.2Ω	N-6150	16-6658	N-4872 Alternate
36	Output IF	29Ω	29Ω	N-4846		

MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
37	Switch	N-2094	Lamp
38	2 Gang Var. Cap.	N-6232	(21-381MMF, 34-200MMF)
	Lamp	N-2595	T-10 (25W. 110V)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	37VAC	92VDC*	92VDC	-15VDC§	0V.	25VAC	-.4VDC
2	12SK7	0V.	25VAC	0V.	-.4VDC	0V.	92VDC	12VAC	92VDC
3	12SQ7	0V.	-.5VDC	0V.	0V.	-.4VDC	65VDC	12VAC	0V.
4	35L6GT	0V.	75VAC	125VDC	92VDC	0V.	130VDC	37VAC	6VDC
5	35Z5GT	0V.	117VAC	110VAC	0V.	117VAC	75VAC	65VAC	130VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	33Ω	250KΩ	250KΩ	22KΩ	.4Ω	22Ω	1.5 Meg.
2	12SK7	220KΩ	22Ω	0Ω	1.5 Meg.	0Ω	250KΩ	12Ω	250KΩ
3	12SQ7	220KΩ	7 Meg.	0Ω	0Ω	500KΩ	450KΩ	12Ω	0Ω
4	35L6GT	220KΩ	75Ω	250KΩ	250KΩ	470KΩ	250KΩ	33Ω	200Ω
5	35Z5GT	220KΩ	185Ω	180Ω	0Ω	185Ω	48Ω	75Ω	250KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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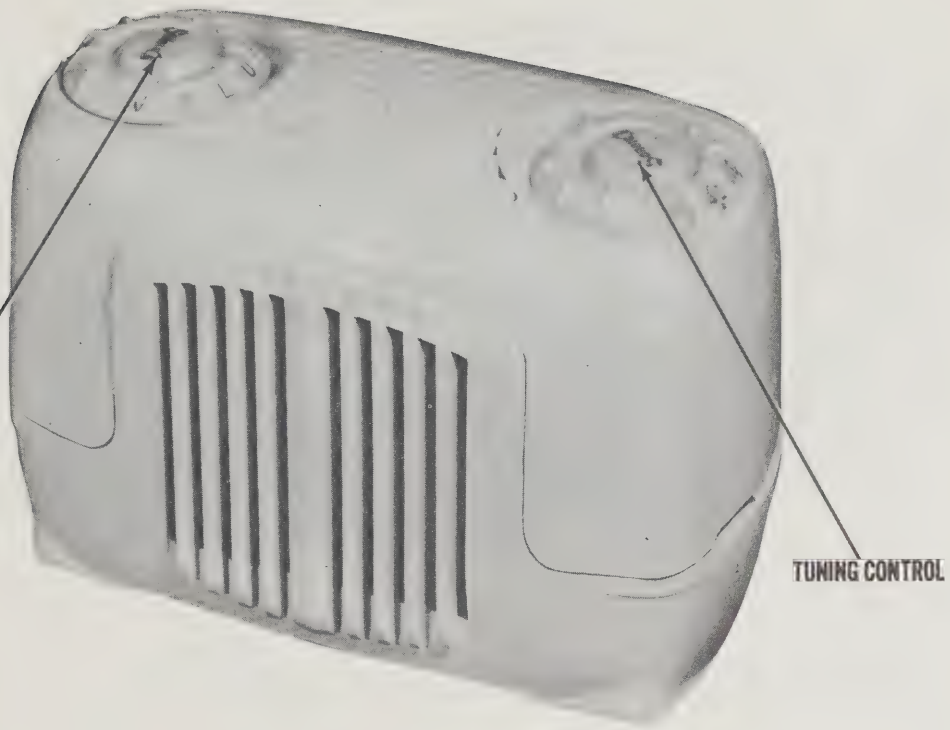
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SONORA MODEL
WJU-252



SONORA MODEL
WJU-252

SONORA MODEL WJU-252

TRADE NAME	Sonora, Model WJU-252
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago,,Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver
TUBES (FOUR)	Types, 12BE6 Converter, 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	535-1620KC RATING .22 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to large stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	50MMFD.	High side to junction of ant. hank and ant. coil (28). Low side to B-.	1620KC	"	"	A3	Adjust for maximum output.
3	50MMFD.	"	1400KC	Tune for maximum output.	"	A4	" " " "

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

SONORA MODEL WJU-252

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SONORA PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	Det.-AVC-AF	12AT6	12AT6	7BT	
3	Power Output	50B5	50B5	7BZ	
4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SONORA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
5A	40	150	N-6281	TA-240	PRSA40302	EZ4215C	DSB-303	Filter-Blue
B	20	150						" -Red
C	20	25		TA-25				Cathode Bypass-Grn.
6	.05	400	N-1346	TC-15	484-05	DT4S5	S-4-05	Line Filter
7	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Output Plate Bypass
8	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
9	.003	600	N-2083	TC-23	684-003	DT6D3	S-6-003	" "
10	.05	200	N-1345	TC-15	484-05	LT2S5	S-4-05	AVC Filter
11	.05	200	N-1345	TC-15	484-05	DT2S5	S-4-05	Line Isolation
12	100	500	N-6015	1FM-31	1468-0001	5W5T1	M0.5-31	AF Plate Bypass-Cer.
13	100	500	N-6015	1FM-31	1468-0001	5W5T1	M0.5-31	Diode RF Filter-Cer.

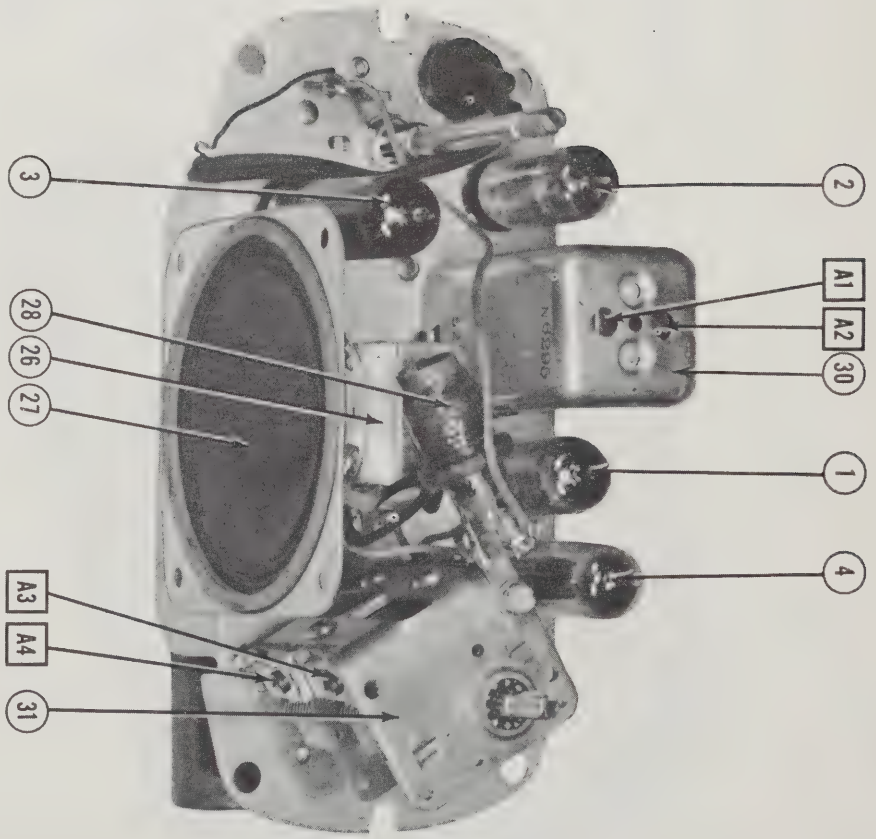
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	
14A	2 Meg.	½	N-6275	D13-139	AM-66-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 14A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	
15	22KΩ	½	N-6012	BTS-22K	Red-Red-Or. Oscillator Grid
16	4.7 Meg.	½	N-4061	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
17	6.8 Meg.	½	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
18	330KΩ	½	N-4423	BTS-330K	Or.-Or.-Yl. AF Plate Load
19	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl. Output Grid
20	180Ω	½	N-4067	BW-½-180	Br.-Gray-Br. Output Cathode
21	2200Ω	½	N-5052	BTS-2200	Red-Red-Red Filter
22	33Ω	½	N-4022	BW-½-33	Or.-Or.-Blk. Surge Limiter
23	33KΩ	½	N-4064	BTS-33K	Or.-Or.-Or. Bleeder
24	47Ω	1	N-6258	BW-1-47	Yl.-Vi.-Blk. Line Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SONORA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
25A B	3000Ω	2.8Ω	300Ω	.6Ω	N-3899 N-6414	A-3876*	T22845*	A-2928*	*Drill one new mounting hole. Alternate transformer.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SONORA PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
26	PM	2.8Ω	N-6279		3A07	
	CONE DIA.	VC DIA.				
27	3-3/8"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

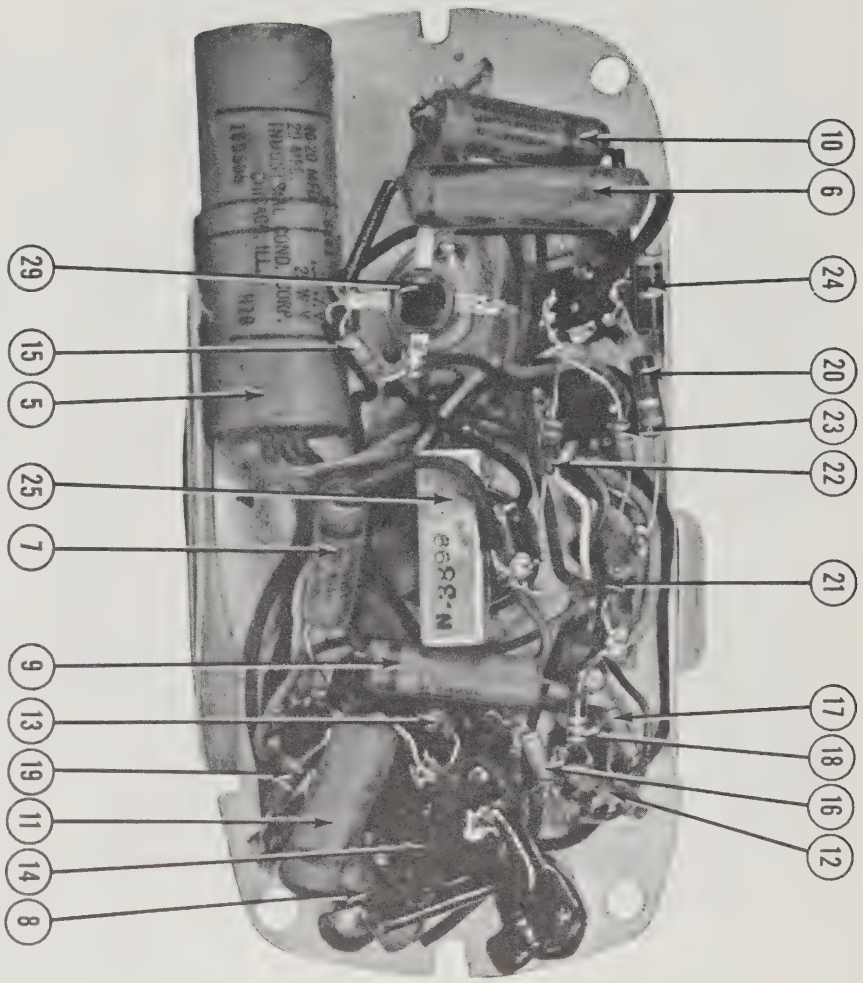
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	
28	Ant. Coil	50Ω	4Ω	N-6292	14-1056	
29	Osc. "	.5Ω	5.6Ω	N-6412	14-1060†	†Add 50MMFD from osc. grid to high side tuning cap.
30	IF Trans.	19.1Ω	19.1Ω	N-6295		

MISCELLANEOUS

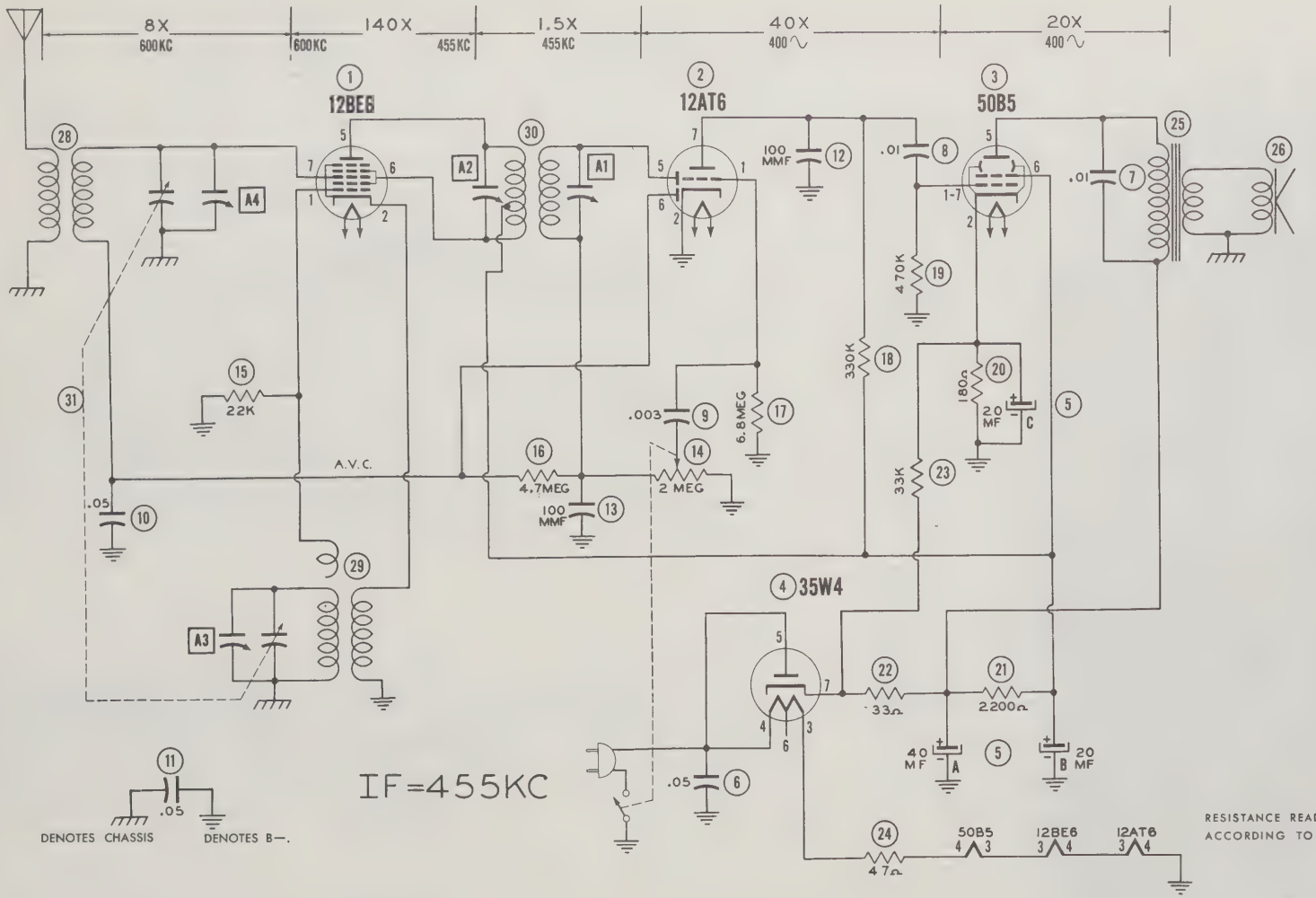
ITEM No.	PART NAME	SONORA PART No.	NOTES
31	2 Gang Var. Cap. Antenna Hank	N-6278 N-3744	(29-393MMF, 39-199MMF)

CHASSIS—BOTTOM VIEW



SONORA MODEL WJU-252

SONORA MODEL WJU-252



Pin No.	12BE6 Volt.	12BE6 Res.	12AT6 Volt.	12AT6 Res.
1	-10VDC§	22KΩ	-.5VDC	7 Meg.
2	0V.	.5Ω	0V.	0Ω
3	25.5VAC	23Ω	13VAC	12Ω
4	13VAC	12Ω	0V.	0Ω
5	99VDC	27KΩ	-.6VDC	2 Meg.
6	99VDC	27KΩ	-.6VDC	6 Meg.
7	-.6VDC	6 Meg.	42VDC	355KΩ

Pin No.	50B5 Volt.	50B5 Res.	35W4 Volt.	35W4 Res.
1	0V.	470KΩ	75VAC	70Ω
2	7VDC	180Ω	0V.	0Ω
3	25.5VAC	23Ω	81VAC	120Ω
4	75VAC	70Ω	117VAC	150Ω
5	125VDC	25KΩ	117VAC	150Ω
6	99VDC	27KΩ	110VAC	145Ω
7	0V.	470KΩ	132VDC	25KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TELE-TONE MODEL 160
(Ch. Series "Y")

TELE-TONE MODEL 160
(Ch. Series "Y")

TELE-TONE MODEL 160

TRADE NAME	Tele-Tone, Model 160 (Ch. Series "Y")
MANUFACTURER	Tele-Tone Radio Corp., 540 W. 58th St., New York 19, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	530-1700KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1700KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TELE-TONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TELE-TONE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	20	150	CE-11	TA-220	PRSA150-20-	EZ42215	DSB-3x20-150	Filter-Blue
B	20	150			20			" -Grn.
C	20	150		UT-201	PRS150-20			" -Red
7	.02	400	CP-203-1	TC-12	484-02	DT4S2	MPH-6-02	Rectifier Bypass
8	.02	400	CP-203-1	TC-12	484-02	DT4S2	S-6-02	Output Plate Bypass
9	.01	200	CP-103-3	TC-11	484-01	DT2S1	S-4-01	Audio Coupling
10	.002	600	CP-202-4	TC-22	684-001	DT6D2	S-6-002	" "
11	.05	200	CP-503-1	TC-15	484-05	DT2S5	S-4-05	AVC Filter
12	.05	200	CP-503-1	TC-15	484-05	DT2S5	S-4-05	Line Isolation
13	150	300	CC-151-1	1FM-315	1468-00015	5W5T15	MO.5-315	Diode RF Filter-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELE-TONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	1 Meg.	½	VC-8	D13-137*	M-63-2*	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 14A per instructions
C	Switch		" "	41	SW-A	" " " " "

*Install a 100KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft side, terminals down.)

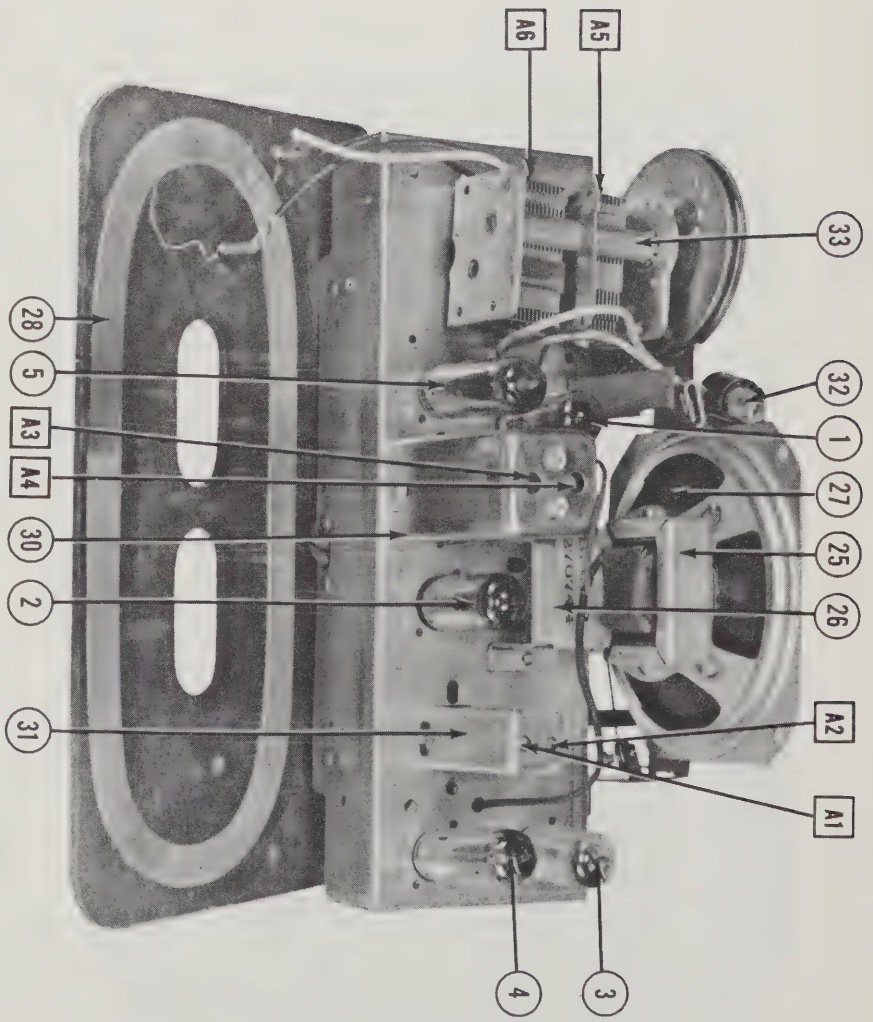
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELE-TONE PART No.	IRC PART No.	IDENTIFICATION CODES
15	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
16	150Ω	½		BW-½-150	Br.-Grn.-Br. IF Cathode
17	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
18	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
19	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
20	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
21	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
22	1500Ω	½		BTS-1500	Br.-Grn.-Red Filter
23	150Ω	1		BW-1-150	Br.-Grn.-Br. "
24	18Ω	½		BW-½-18	Br.-Gray-Blk. Surge Limiter

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TELE-TONE PART No.	STANCOR PART No.	THORDAR'N PART No.	QUAM PART No.	INSTALLATION NOTES
25	2500Ω	3.4Ω	180Ω	.5Ω	TR-1	A-3876‡	T22S45‡	A-2928‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA TELE-TONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113†		†Fabricate new mounting bracket.
26	PM	3.4Ω	SP43-8	Mod. P4-X	4A07†	
	CONE DIA.	VC DIA.				
27	4"	1/2"	CONE HAS SPECIAL ADJUSTMENT FEATURE-ORDER FROM MANUFACTURER			

R F COILS

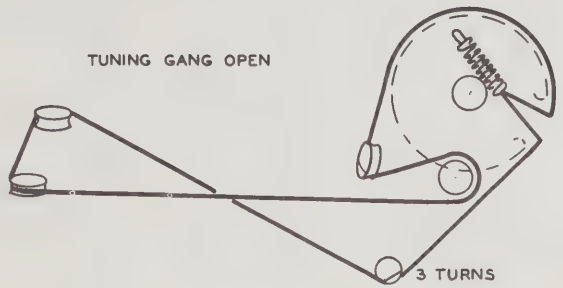
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TELE-TONE PART No.	MEISSNER PART No.	
28	Loop Ant.		2.2Ω	LP-7		LP-8 Alternate
29	Osc. Coil	.4Ω	5.5Ω	LC-1	14-1060#	#Add 50MMFD from osc. grid to high side tuning cap.
30	Input IF	18.9Ω	18.5Ω	A-LF-1	16-6658	
31	Output IF	8.2Ω	8.1Ω	LF26	16-6678	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA TELE-TONE PART No.		INSTALLATION NOTES
32	Bayonet	6-8	0.15	Brown	BU-47		Type 47

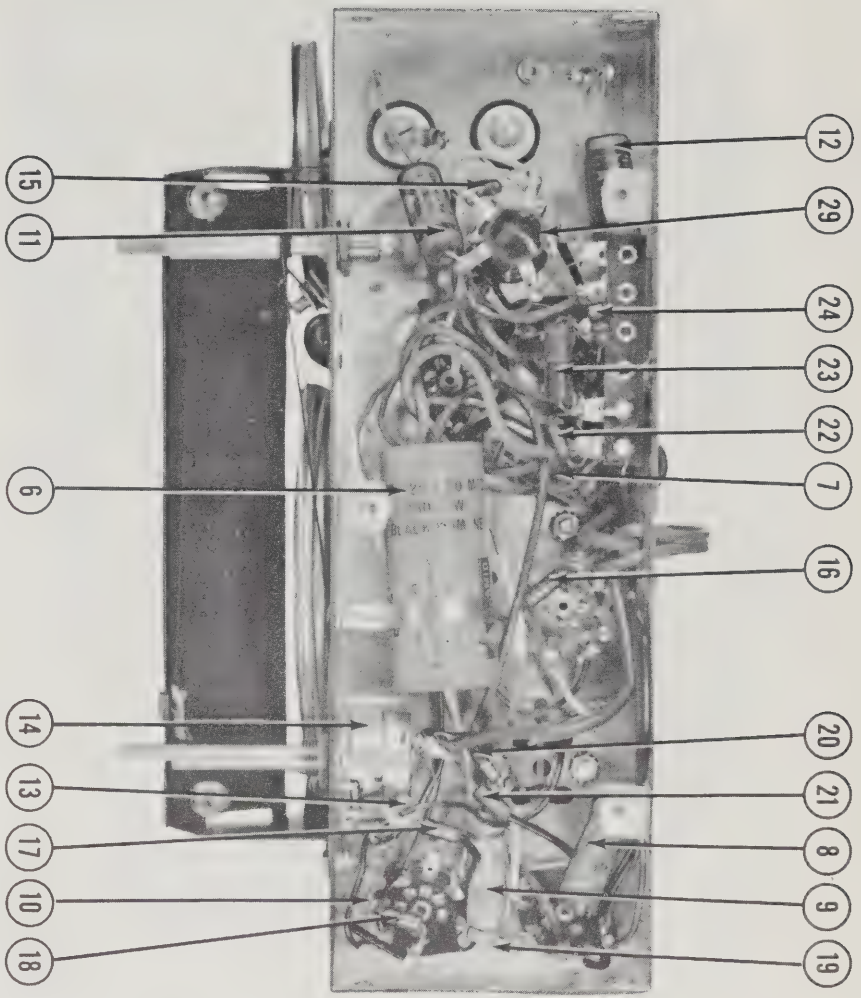
MISCELLANEOUS

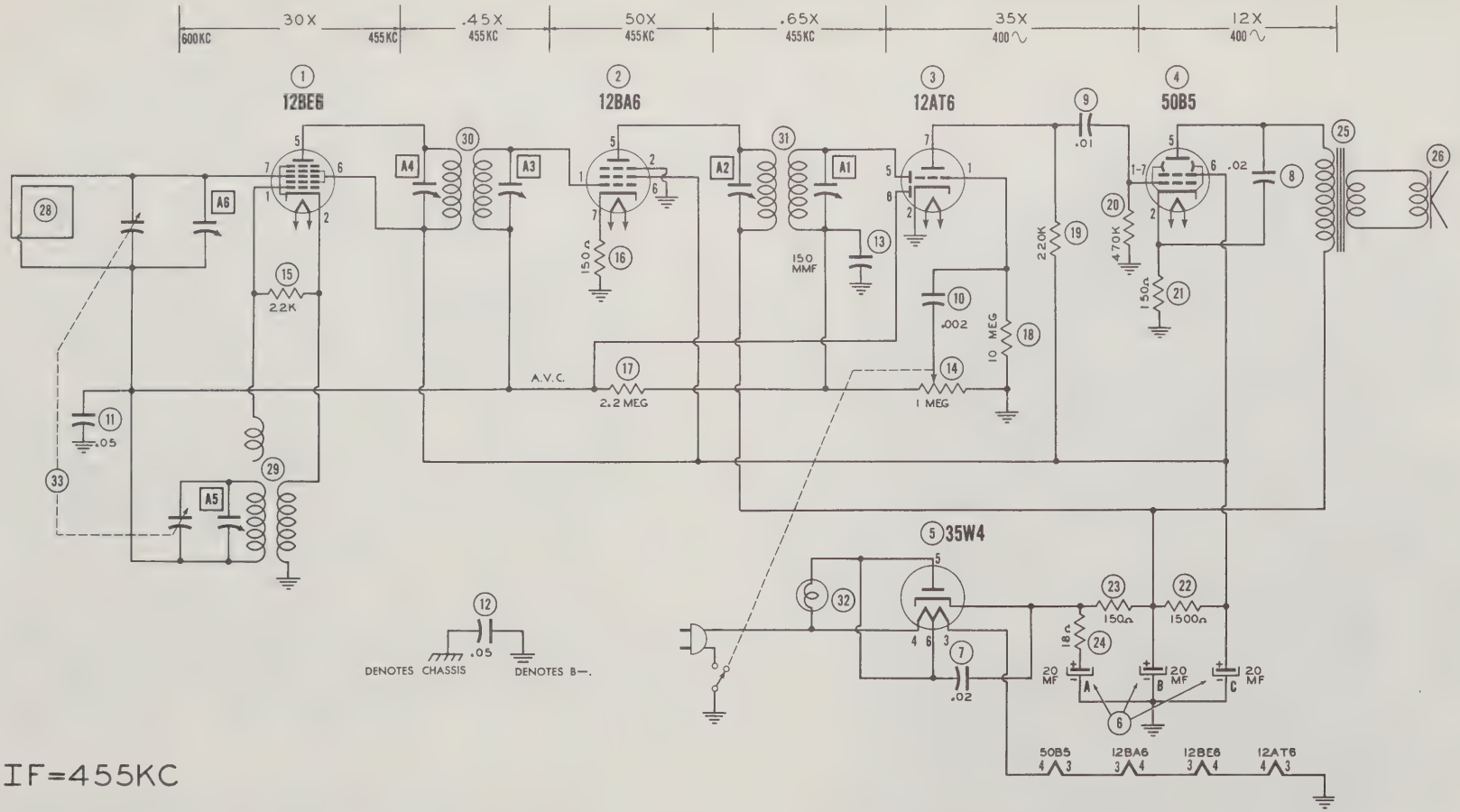
ITEM No.	PART NAME	TELE-TONE PART No.	NOTES
33	2 Gang Var. Cap.	CV-13	(31-462MMF, 29-192MMF)
	Dial Pointer	PN-10	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-8VDC§	0V.	25VAC	12VAC	85VDC	85VDC	-.5VDC
2	12BA6	-.5VDC	0V.	38VAC	25VAC	107VDC	85VDC	1.4VDC
3	12AT6	-.7VDC	0V.	0V.	12VAC	-.4VDC	-.5VDC	60VDC
4	50B5	0V.	5VDC	38VAC	85VAC	110VDC	85VDC	0V.
5	35w4	0V.	0V.	85VAC	117VAC	112VAC	112VAC	117VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	.4Ω	24Ω	12Ω	300KΩ	300KΩ	3 Meg.
2	12BA6	3 Meg.	0Ω	36Ω	24Ω	300KΩ	300KΩ	150Ω
3	12AT6	10 Meg.	0Ω	0Ω	12Ω	1 Meg.	3 Meg.	520KΩ
4	50B5	470KΩ	130Ω	36Ω	80Ω	300KΩ	300KΩ	470KΩ
5	35W4	INF.	INF.	80Ω	115Ω	110Ω	110Ω	300KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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486-24

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

TRAV-LER MODEL
5015

TRAV-LER MODEL
5015

TRAV-LER MODEL 5015

TRADE NAME	Trav-Ler, Model 5015
MANUFACTURER	Trav-Ler Radio & Tel. Corp., 571 W. Jackson, Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .21 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 to reduce hum modulation.
2	.1 MFD.	"	1720KC	"	"	A5	Adjust for maximum output.
3	200MMFD	High side to ext. ant. lead. Low side to B-.	1400KC	Tune for maximum output.	"	A6	" " " "
4	200MMFD	"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 3/48-#486-25 SET #36-FOLDER #25

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7GT	12SK7GT	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRAV-LER PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	EC-12	TA-240	PRSA150-20-40	EDL4215	DSB-3x20-150*	Filter-Red
B	20	150						" -Yl.
7	.05	600	PC-5	TC-15	684-05	DT6S5	MPH-6-05	Line Filter
8	.01	400	PC-7	TC-11	484-01	DT4S1	S-4-01	Output Plate Bypass
9	.01	400	PC-7	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
10	.01	400	PC-7	TC-11	484-01	DT4S1	S-4-01	" "
11	.05	600	PC-5	TC-15	684-05	DT6S5	S-6-05	AVC Filter
12	.1	400	PC-8	TC-1	484-.1	DT4P1	S-4-1	Line Isolation
13	.01	400	PC-7	TC-11	484-01	DT4S1	S-4-01	Ext. Ant. Coupling
14	500	500	MC-5	1FM-35	1468-0005	5W5T5	MO.5-35	AF Plate Bypass
15	100	500	MC-2	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter
16	100	500	MC-2	1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.
38	10	500		MS-41	1469-000001	5R5Q1	MOS.5-41	Fixed Trimmer-Cer.

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	1 Meg.	½	VC-4	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

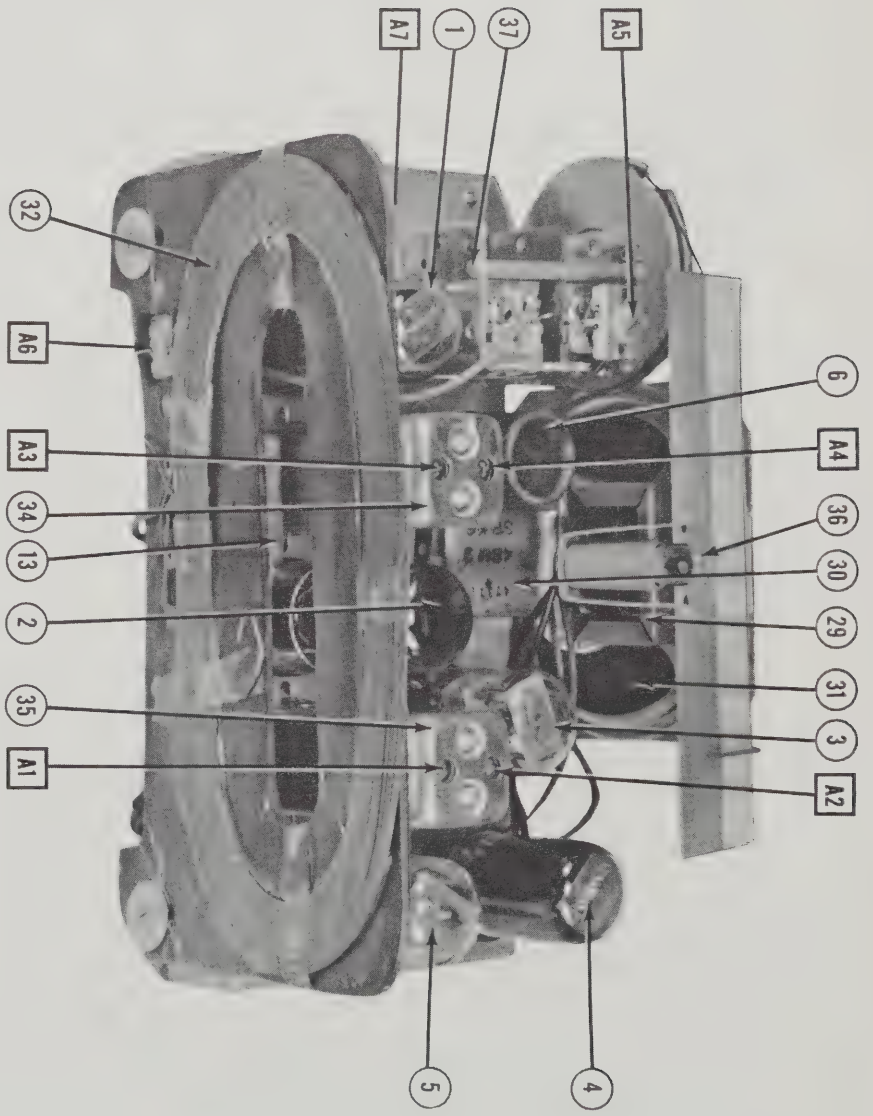
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	IDENTIFICATION CODES
18	22KΩ	½	1R-9	BTS-22K	Red-Red-Or. Oscillator Grid
19	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Line Isolation
20	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
21	47KΩ	½	1R-10	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
22	2.2 Meg.	½	1R-13	BTS-2.2 Meg.	Red-Red-Grn. AF Grid
23	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. Output Grid
25	150Ω	½	1R-14	BW-½-150	Br.-Grn.-Br. Output Cathode
26	2200Ω	1	1R-25	BTA-2200	Red-Red-Red Filter
27	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Surge Limiter
28	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TRAV-LER PART No.	STANCOR PART No.	THORDAR'N PART No.	QUAM PART No.	INSTALLATION NOTES
29	2300Ω	3.4Ω	150Ω	.5Ω	Part of SPK-6	A-3876‡	T22S45‡	A-2928‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRAV-LER PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113†		†Drill and tap magnet frame.
30	PM	3.4Ω	SPK-6	Mod. P4-X	4A07	
	CONE DIA.	VC DIA.				
31	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

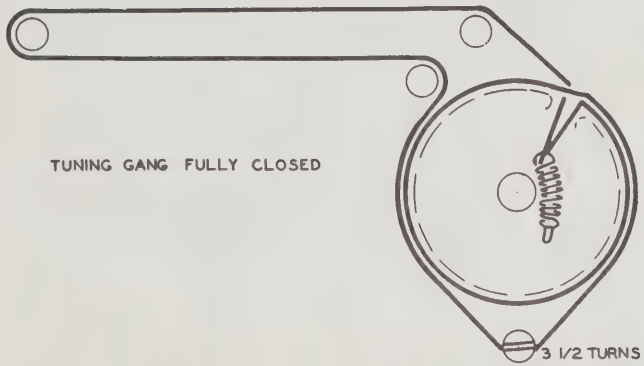
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.
32	Loop Ant.	.2Ω	1Ω	LL-4	
33	Osc. Coil		6.5Ω	LO-7	14-1040
34	Input IF	19Ω	19Ω	LI-1	16-6658
35	Output IF	20.5Ω	19Ω	LI-2	16-6660

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TRAV-LER PART No.		
36	Bayonet	6-8	0.15	Brown	PB-1		Type 47

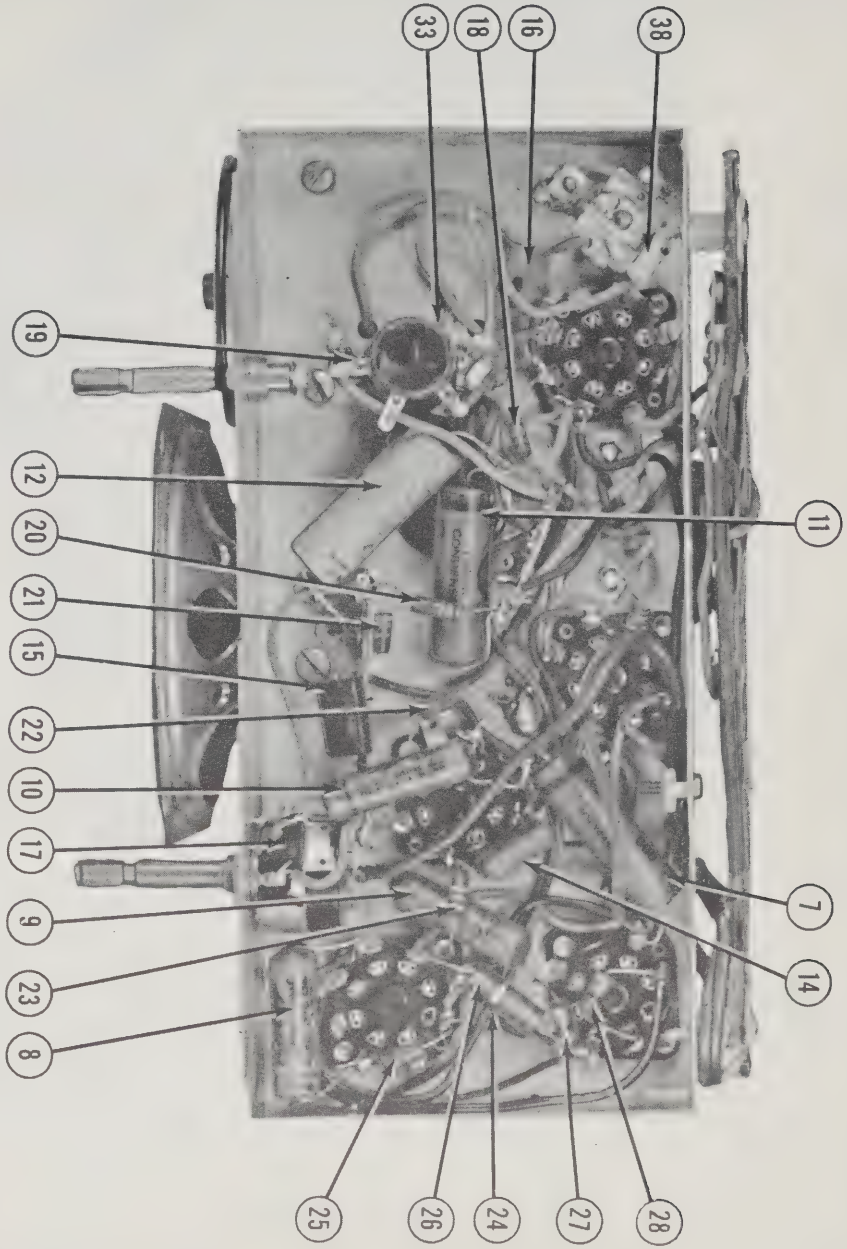
MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
37	2 Gang Var. Cap.	GC-1	(16-562MMF, 15-475MMF)
A5	Trimmer	TC-6	Osc. Adj.
A6	"	TC-7	Ant. Adj.
A7	Padder	TC-9	Osc. Adj.



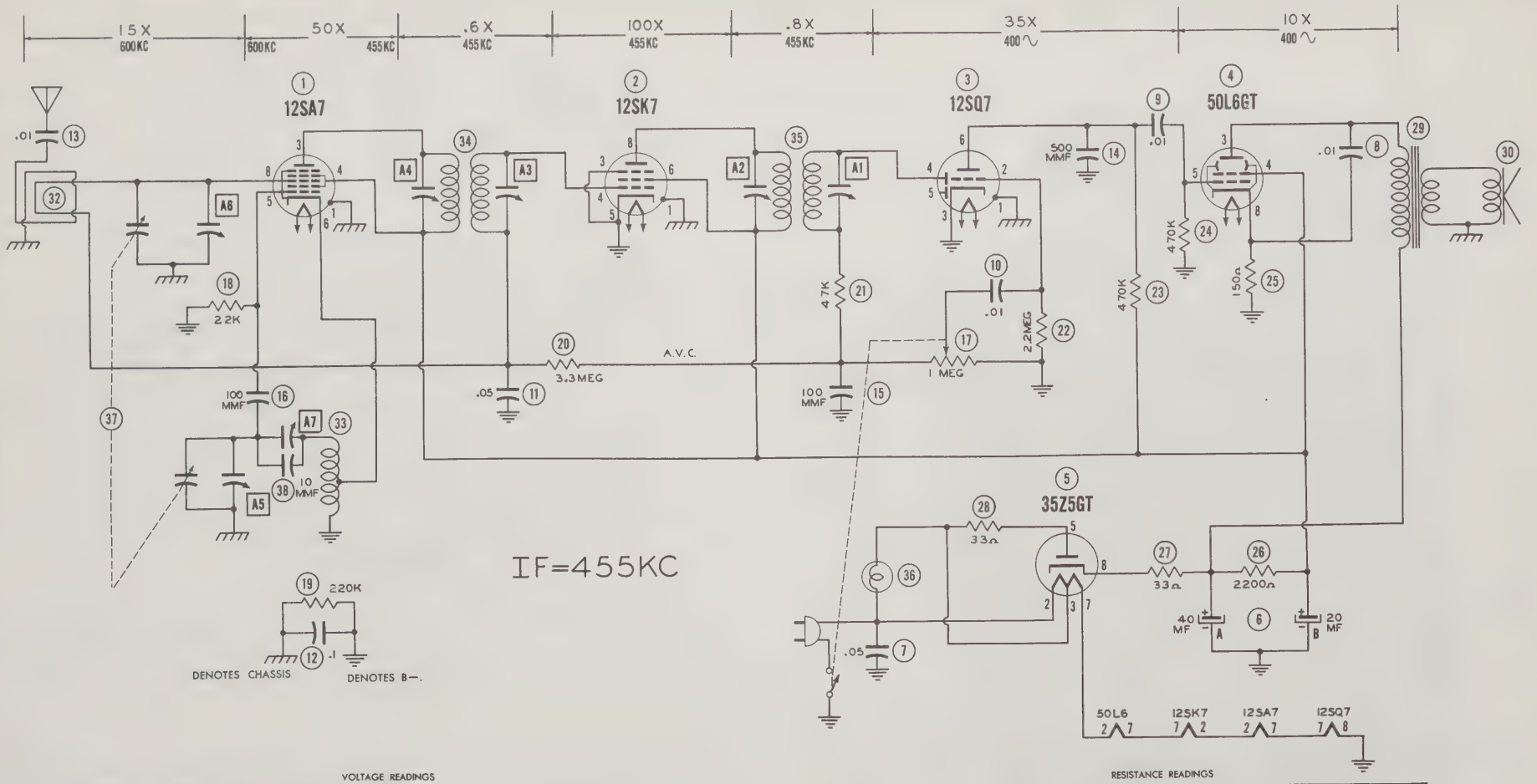
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



TRAV-LER MODEL 501B

TRAV-LER MODEL 501B



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	24.5VAC	72VDC	72VDC	-9VDC§	0V.	12VAC	-.6VDC
2	12SK7GT	0V.	24.5VAC	0V.	-.6VDC	0V.	72VDC	37VAC	72VDC
3	12SQ7GT	0V.	-.8VDC	0V.	-.4VDC	0V.	37VDC	12VAC	0V.
4	50L6GT	0V.	86VAC	112VDC	72VDC	0V.	0V.	37VAC	4.6VDC
5	35Z5GT	0V.	117VAC	113VAC	0V.	112VAC	115VDC	86VAC	117VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	24Ω	300KΩ	300KΩ	22KΩ	.5Ω	13Ω	4 Meg.
2	12SK7GT	0Ω	24Ω	0Ω	4 Meg.	0Ω	300KΩ	37Ω	300KΩ
3	12SQ7GT	0Ω	2.2 Meg.	0Ω	1 Meg.	INF.	770KΩ	13Ω	0Ω
4	50L6GT	INF.	85Ω	300KΩ	300KΩ	470KΩ	0Ω	37Ω	165Ω
5	35Z5GT	INF.	112Ω	110Ω	INF.	150Ω	300KΩ	85Ω	300KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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486-25

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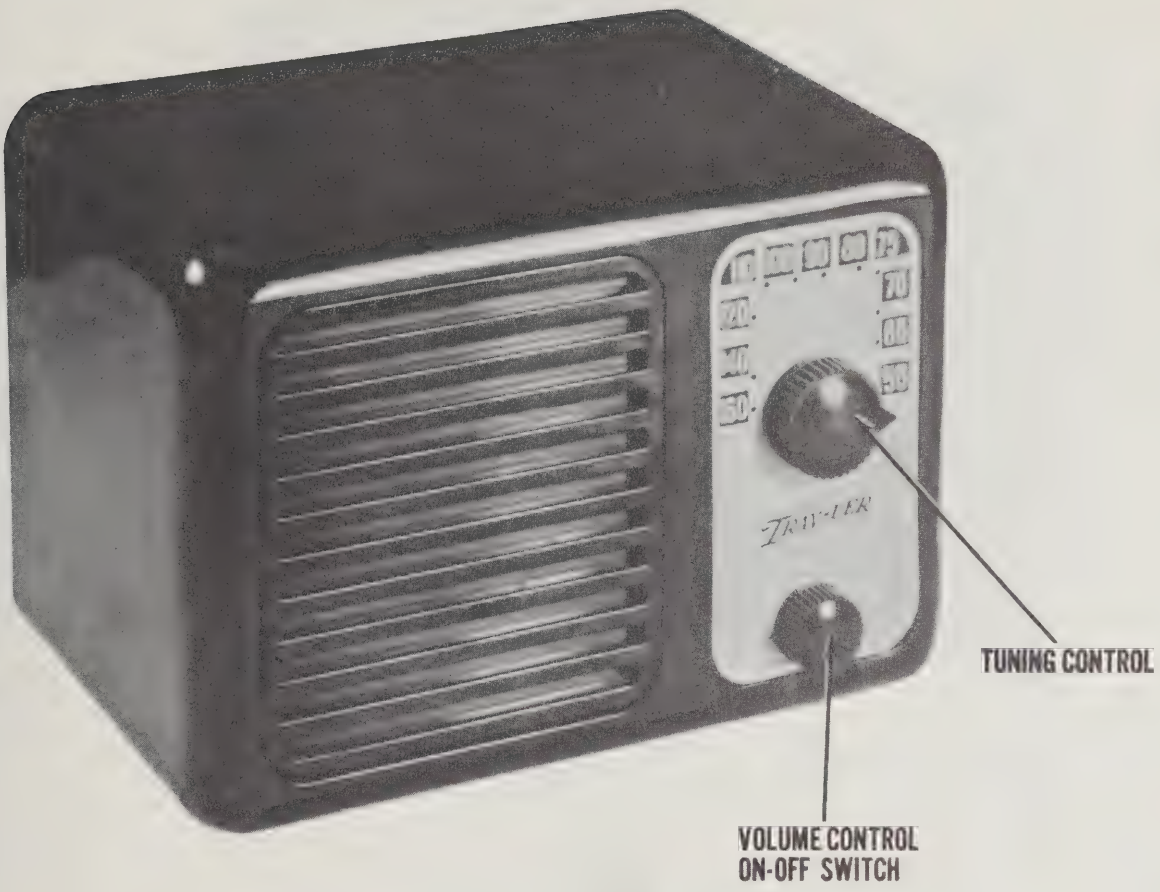
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TRAV-LER MODEL
5054



TRAV-LER MODEL
5054

TRAV-LER MODEL 5054

TRADE NAME	Trav-Ler, Model 5054
MANUFACTURER	Trav-Ler Radio & Tel. Corp., 571 W. Jackson, Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver
TUBES (FOUR)	Types, 12SA7GT Converter, 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1650KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.1 MFD.	"	1650KC	"	"	A3	Adjust for maximum output.
3	200MMFD	High side to junction of ant. coil 31 and ant. hank. Low side to B-.	1400KC	Tune for maximum output.	"	A4	" " " "

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PARTS LIST AND DESCRIPTIONS

TRAV-LER MODEL 5054

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	6AD	
2	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
3	Power Output	50L6GT	50L6GT	7AC	
4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRAV-LER PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	30	150	EC-15	TA-230	PRSA150-20-30	EZ3315	DSB-2x30-150	Filter-Red
B	20	150						" -Grn.
6	.05	400	PC-5	TC-15	484-05	DT4S5	MPH-4-05	Line Filter
7	.01	400	PC-7	TC-11	484-01	DT4S1	S-4-01	Output Plate Bypass
8	.005	600	PC-6	TC-25	684-005	DT6D5	S-6-005	Audio Coupling
9	.005	600	PC-6	TC-25	684-005	DT6D5	S-6-005	" "
10	.05	400	PC-5	TC-15	484-05	DT4S5	S-4-05	AVC Filter
11	.05	400	PC-5	TC-15	484-05	DT4S5	S-4-05	Line Isolation
12	470	500	MC-5	1FM-35	1468-0005	5W5T5	MO.5-35	AF Plate Bypass
13	100	500	MC-2	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter
14	50	500	MC-4	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.
15	10	500		MS-41	1468-00001	5W5Q1	MO.5-41	Ant. Coupling

CONTROLS

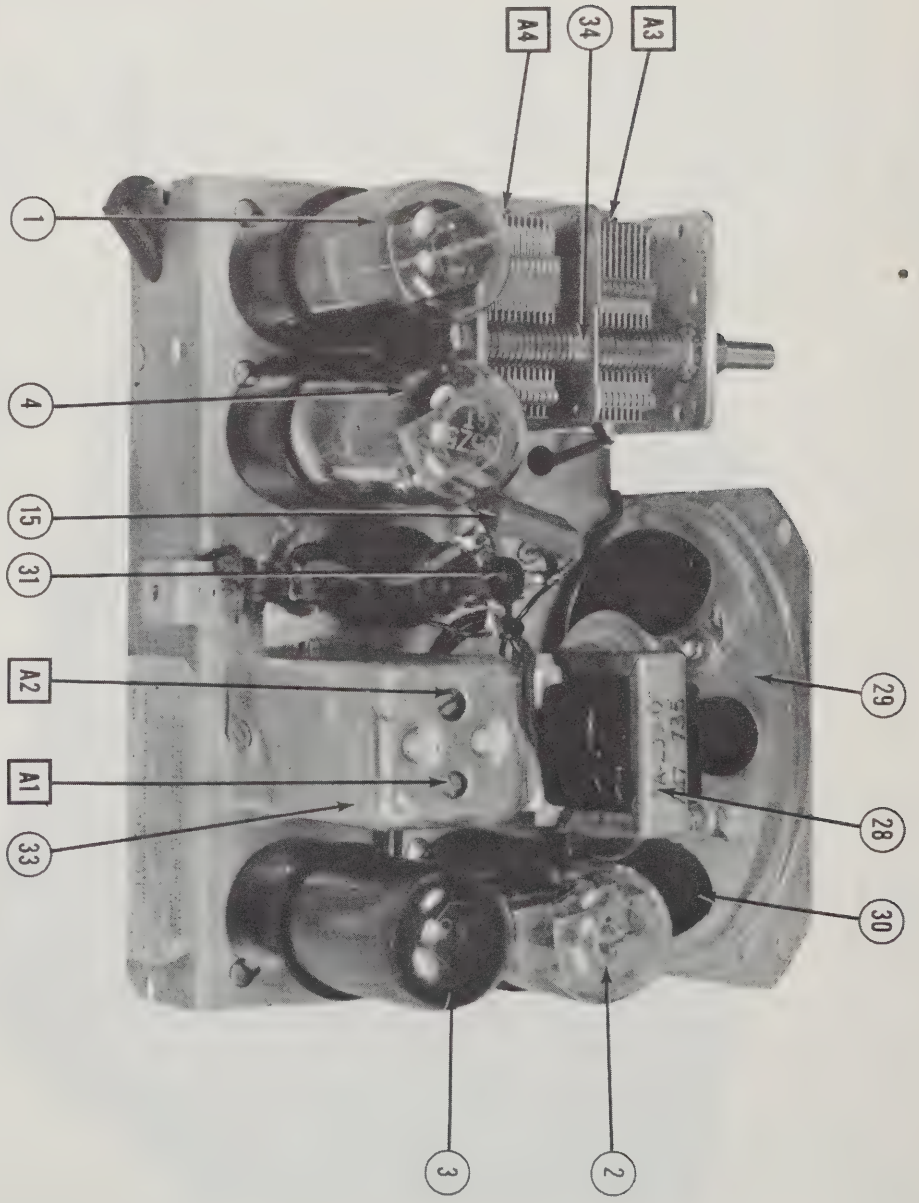
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16	1 Meg.	½	VC-9			Volume Control & Sw.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	IDENTIFICATION CODES
17	22KΩ	½	1R-9	BTS-22K	Red-Red-Or. Oscillator Grid
18	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Line Isolation
19	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
20	10 Meg.	½	1R-3	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
22	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. Output Grid
23	150Ω	½	1R-14	BW-½-150	Br.-Grn.-Br. Output Cathode
24	2200Ω	1	1R-25	BTA-2200	Red-Red-Red Filter
25	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Surge Limiter
26	47Ω	1	1R-41	BW-1-47	Yl.-Vi.-Blk. Line Dropping
27	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Parasitic Suppressor-See Note

Note-Not used in all models.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRAV-LER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
28	1800Ω	3.4Ω	150Ω	.5Ω	Part of SPK-10	A-3876*	T22S45*	A-2928*	*Mount on chassis.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRAV-LER PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
29	PM	3.4Ω	SPK-10		4A07	
	CONE DIA.	VC DIA.				
30	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

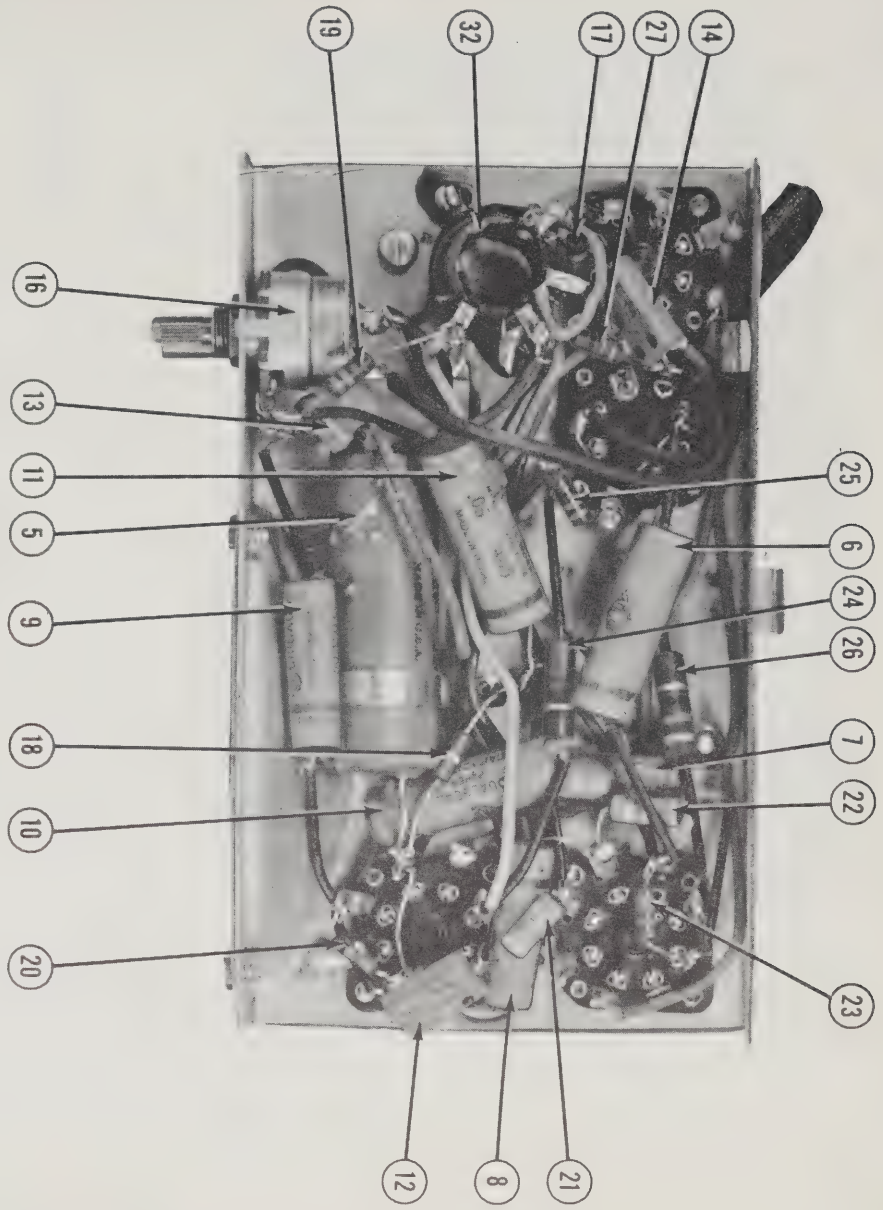
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.	
31	Ant. Coil	23.1Ω	2Ω	LA-3	14-1056	
32	Osc. Coil	.8Ω	6.1Ω	LO-14	14-1060	
33	IF Trans.	16Ω	15.9Ω	LI-8		

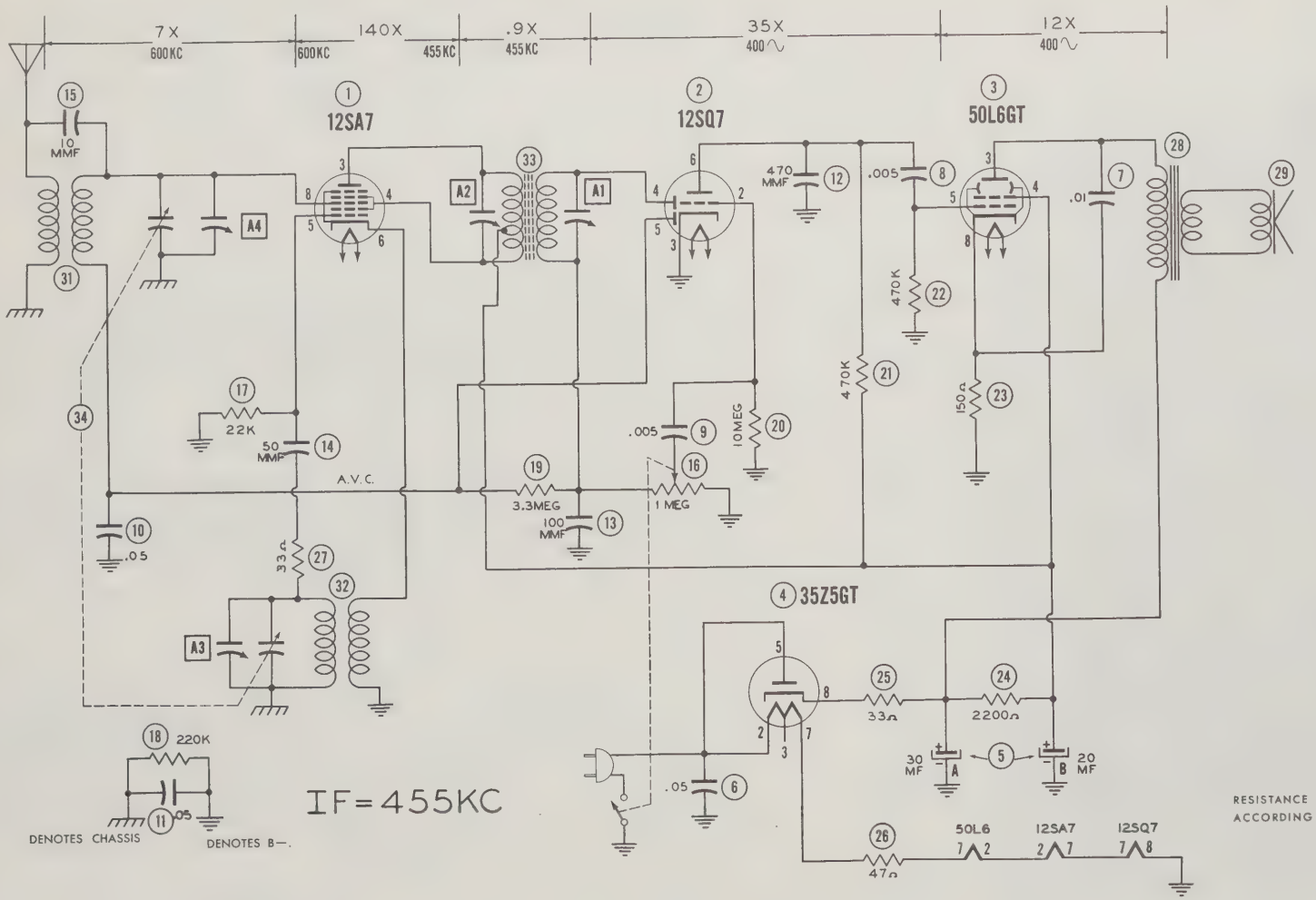
MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
34	2 Gang Var. Cap.	GC-7X	(18-452MMF, 33-197MMF)

CHASSIS—BOTTOM VIEW



TRAV-LER MODEL 5054



Pin No.	12SA7GT Volt.	12SA7GT Res.	12SQ7GT Volt.	12SQ7GT Res.
1	0V.	220KΩ	0V.	220KΩ
2	25VAC	25Ω	-.9VDC	10 Meg.
3	98VDC	100KΩ	0V.	0Ω
4	98VDC	100KΩ	-.5VDC	1 Meg.
5	-12VDC§	22KΩ	-.9VDC	4 Meg.
6	0V.	.8Ω	47VDC	570KΩ
7	12.5VAC	12Ω	12.5VAC	12Ω
8	-.8VDC	4 Meg.	0V.	0Ω

Pin No.	50L6GT Volt.	50L6GT Res.	35Z5GT Volt.	35Z5GT Res.
1	0V.	INF.	127VDC	100KΩ
2	25VAC	25Ω	117VAC	150Ω
3	122VDC	100KΩ	110VAC	145Ω
4	98VDC	100KΩ	0V.	220KΩ
5	0V.	470KΩ	117VAC	150Ω
6	0V.	0Ω	0V.	INF.
7	75VAC	75Ω	82VAC	120Ω
8	6.8VDC	160Ω	130VDC	100KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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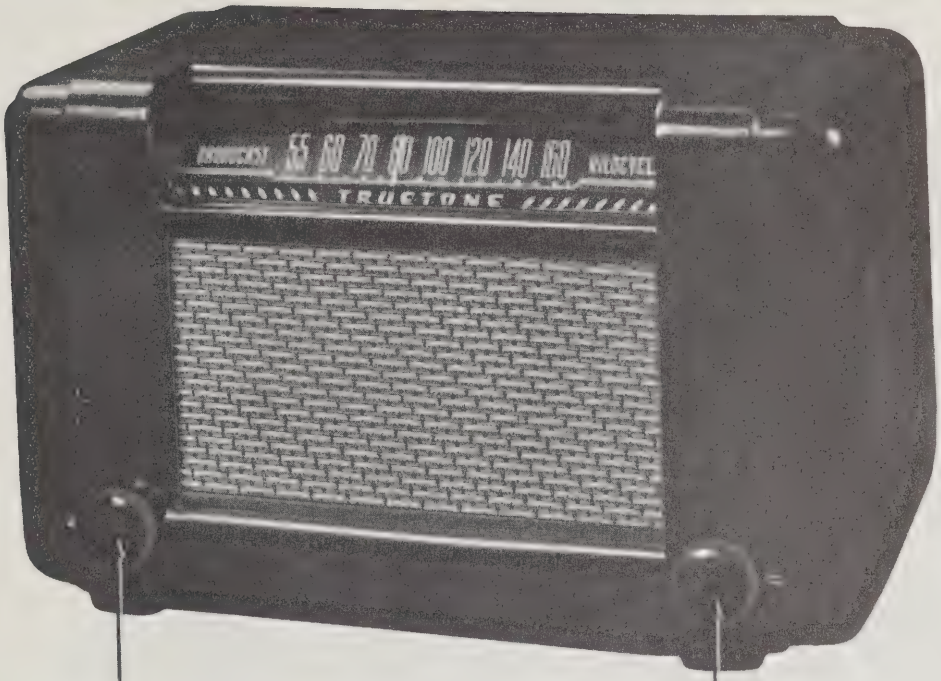
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D2810
(Fact. #24D24-730BB)



TRUETONE MODEL D2810
(Fact. #24D24-730BB)

TRUETONE MODEL D2810

TRADE NAME	Truetone, Model D2810 (Factory No. 24D24-730BB)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .21 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 12SK7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.1 MFD.	High side to large stator of tuning cap. Low side to chassis.	455KC	"	"	A3,A4	Adjust for maximum output.
3	.1 MFD.	"	1620KC	"	"	A5	Adjust for maximum output. Reassemble receiver in cabinet.
4		Loop	1400KC	Tune for maximum output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Set pointer to 1400KC calib. mark.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D2010

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRUETONE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	40	150	45X363	EL-35	AF88D	UP4415	DY-2x40-150	Filter - Red
B	40	150						" - Yl.
7	.05	400	D66503	TC-15	484-05	DT4S5	MPH-4-05	Line Filter
8	.05	400	D66503	TC-15	484-05	DT4S5	S-4-05	Output Plate Bypass
9	.005	400	D66502	TC-25	484-005	DT6D5	S-6-005	Audio Coupling
10	.005	200	B66502	TC-25	484-005	DT6D5	S-6-005	" "
11	.05	200	B66503	TC-15	484-05	DT2S5	S-4-05	AVC Filter
12	220	500	47X468	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass-Cer.
13	220	500	47X468	1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	
14A	500KΩ	½	36X373	D13-133	AM-60-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to14A per instructions
C	Switch		" "	41	SW-A	" " " " "

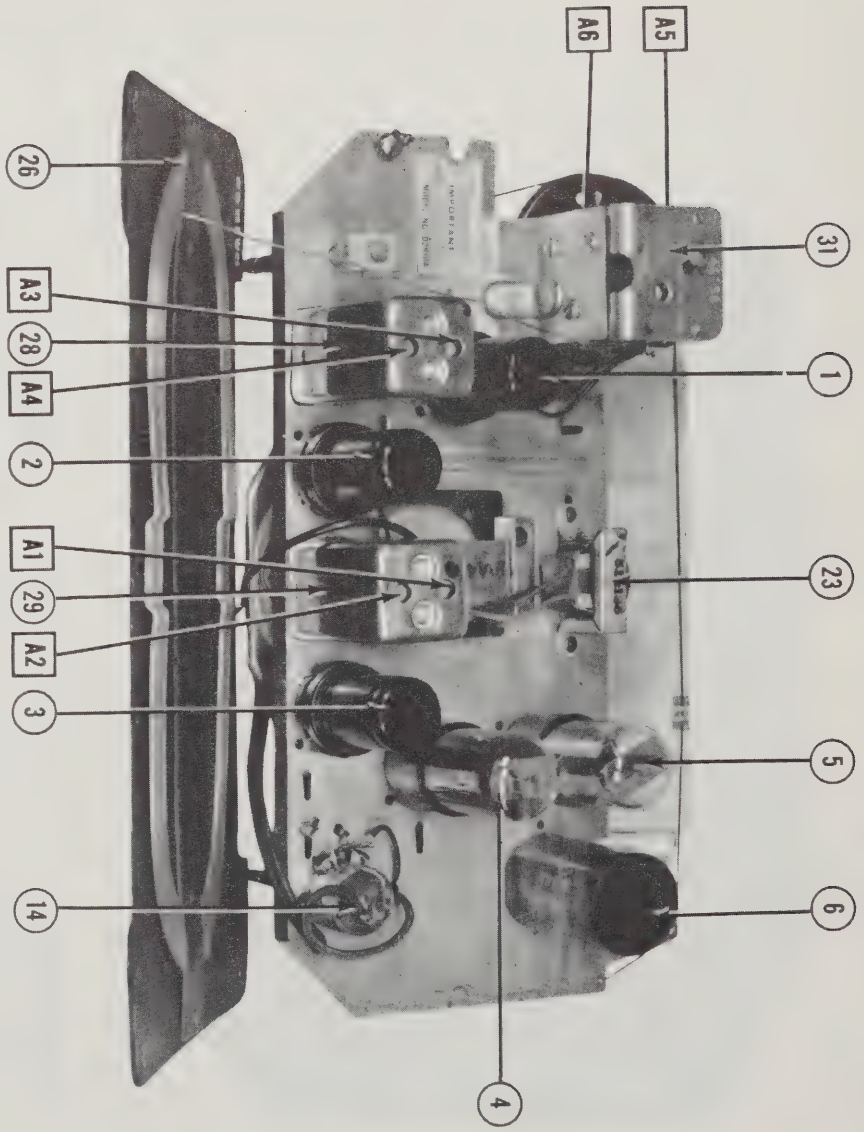
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
15	22KΩ	½	B84223	BTS-22K	Red-Red-Or. Oscillator Grid
16	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
17	10 Meg.	½	B85106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
18	470KΩ	½	B84474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
19	470KΩ	½	B84474	BTS-470K	Yl.-Vi.-Yl. Output Grid
20	150Ω	½	B83151	BW-½-150	Br.-Grn.-Br. Output Cathode
21	1500Ω	1	C85152	BTA-1500	Br.-Grn.-Red Filter
22	27Ω	½	B83270	BW-½-27	Red-Vi.-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
23	1650Ω	3.1Ω	180Ω	.6Ω	51X135	A-3876*	T22S45*	A-2928*	*Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
24	FIELD PM	VC IMP. 3.1Ω	12A479	ST-105† Mod. P5-X	5A07†	†Fabricate new mounting bracket.
25	CONE DIA. 4-3/4"	VC DIA. 1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

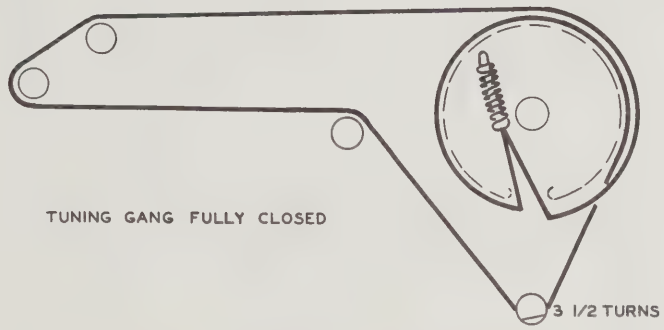
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA MEISSNER PART No.	
26	Loop Ant.		1.2Ω	9A1943		
27	Osc. Coil		6Ω	9A1914	14-1060‡	‡Add 50MMFD from osc. grid to high side tuning cap.
28	Input IF	18Ω	19Ω	9A1941	16-6658	
29	Output IF	18Ω	16Ω	9A1942	16-6660	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA TRUETONE PART No.	REPLACEMENT DATA	INSTALLATION NOTES
30	Bayonet	6-8	0.15	Brown	7A103		Type 47

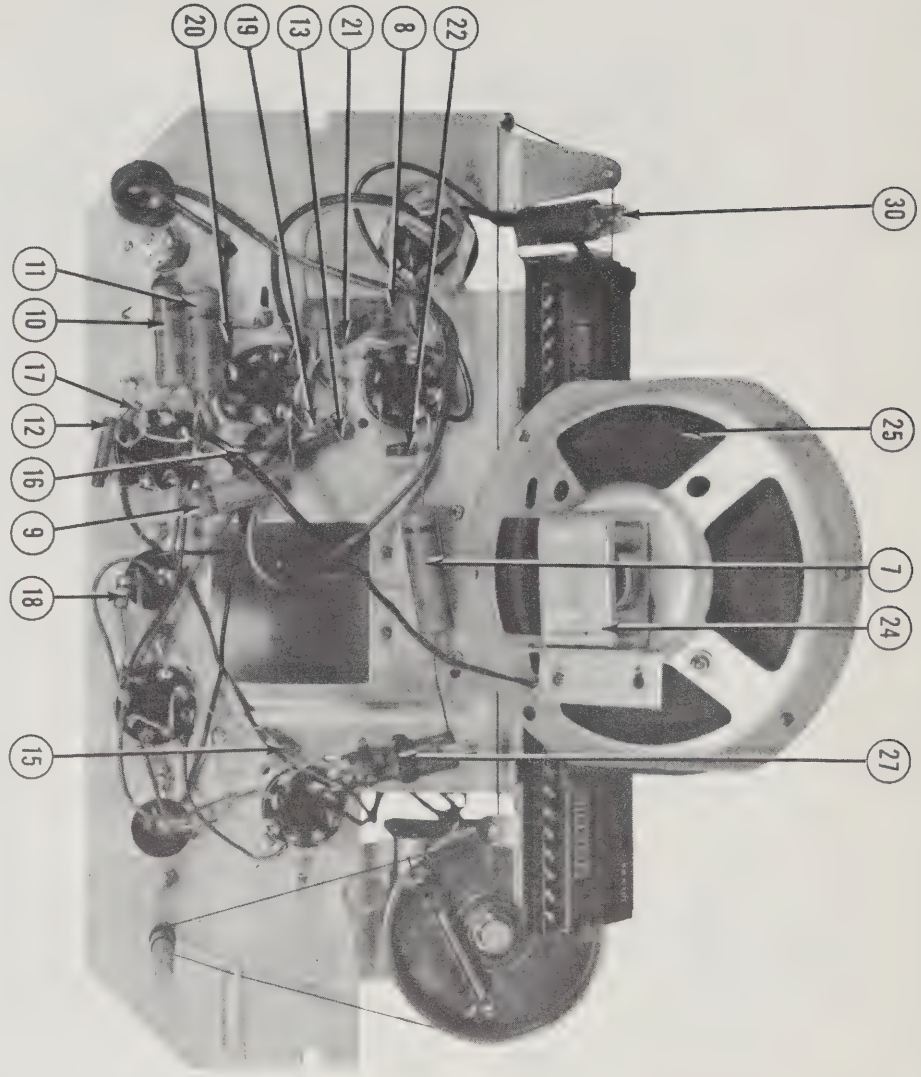
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
31	2 Gang Var. Cap.	14A199	(34-475MMF, 34-198MMF)
	Dial	58X701	Glass
	Dial Pointer	15X242	
	Knob	10A297	

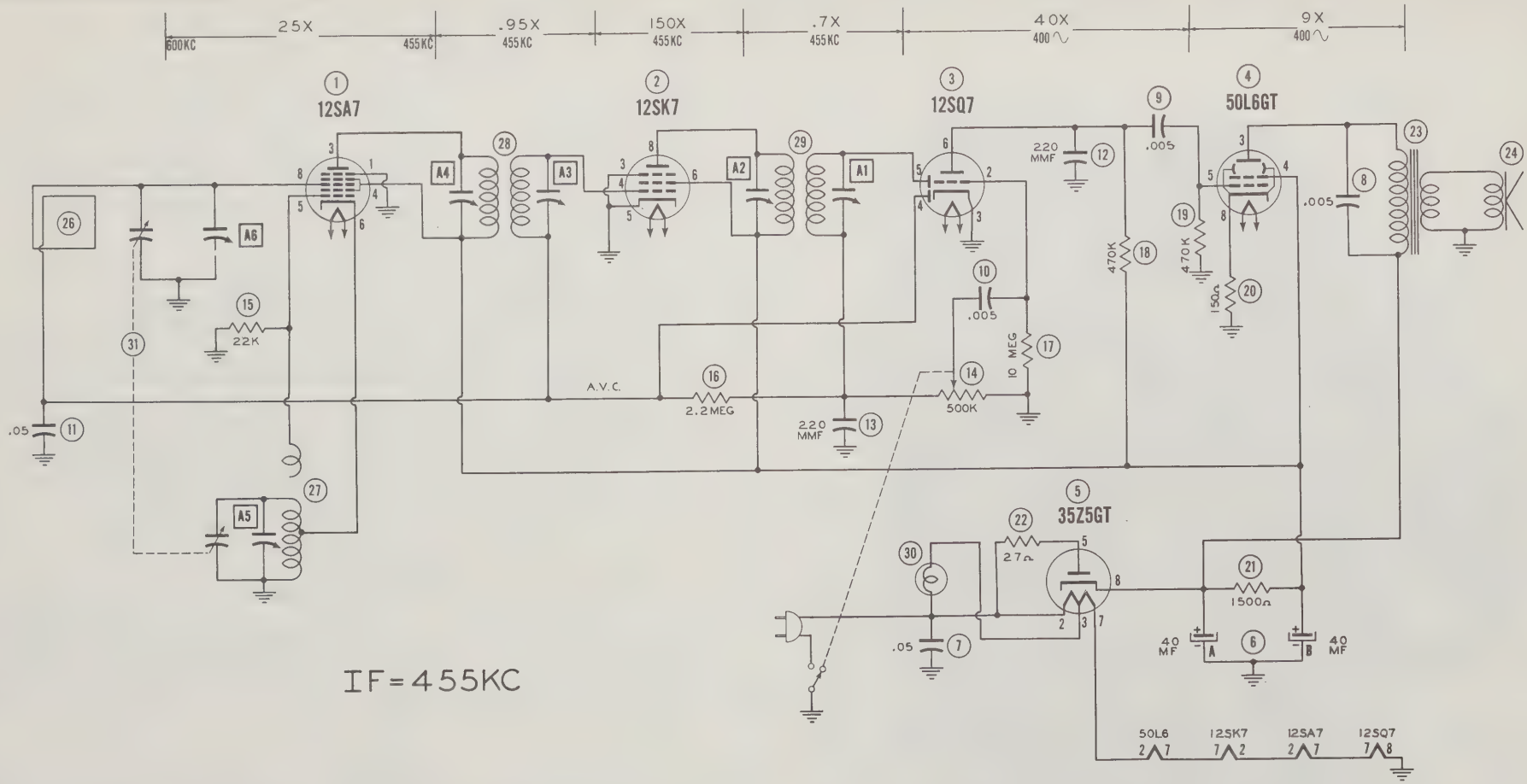


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



TRUETONE MODEL D2810



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	26VAC	83VDC	83VDC	-11VDC§	0V.	14VAC	-.4VDC
2	12SK7	0V.	26VAC	0V.	-.4VDC	0V.	83VDC	40VAC	83VDC
3	12SQ7	0V.	-.7VDC	0V.	-.4VDC	-.35VDC	47VDC	14VAC	0V.
4	50L6GT	0V.	86VAC	111VDC	83VDC	0V.	-.35VDC	40VAC	5.3VDC
5	35Z5GT	0V.	117VAC	114VAC	0V.	112VAC	0V.	86VAC	123VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0Ω	24Ω	300KΩ	300KΩ	22KΩ	.6Ω	12Ω	3 Meg.
2	12SK7	0Ω	24Ω	0Ω	3 Meg.	0Ω	300KΩ	36Ω	300KΩ
3	12SQ7	0Ω	10 Meg.	0Ω	3 Meg.	500KΩ	770KΩ	12Ω	0Ω
4	50L6GT	INF.	80Ω	300KΩ	300KΩ	470KΩ	500KΩ	36Ω	150Ω
5	35Z5GT	INF.	110Ω	105Ω	INF.	114Ω	INF.	40Ω	300KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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486-27

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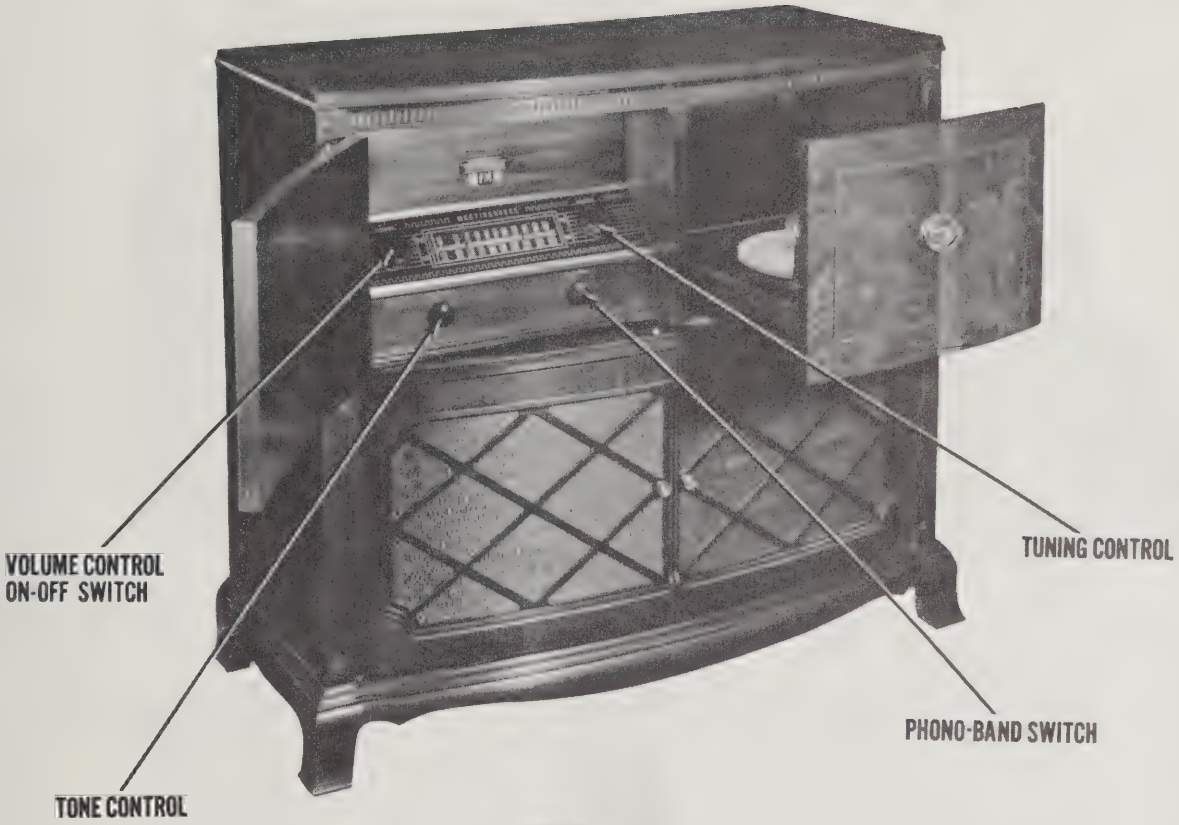
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

WESTINGHOUSE MODELS H-164, H-166, H-167 (Ch. V-2119-1)



MODEL H-166

WESTINGHOUSE MODELS H-164, H-166, H-167 (Ch. V-2119-1)

TRADE NAME	Westinghouse, Models H-164, H-166, H-167 (Ch. V-2119-1)
MANUFACTURER	Westinghouse Electric Corp., Receiver Div., Sunbury, Pa.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver
TUBES (TWELVE)	Types, 7F8 RF Amp., 7F8 Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AU6 Limiter, 6H6 FM Det., 6AT6 AM Det.-AVC, 6SC7 Phono Pre-Amp., 6AT6 Phase Inv., (2) 6Y6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE-BROADCAST	540-1620KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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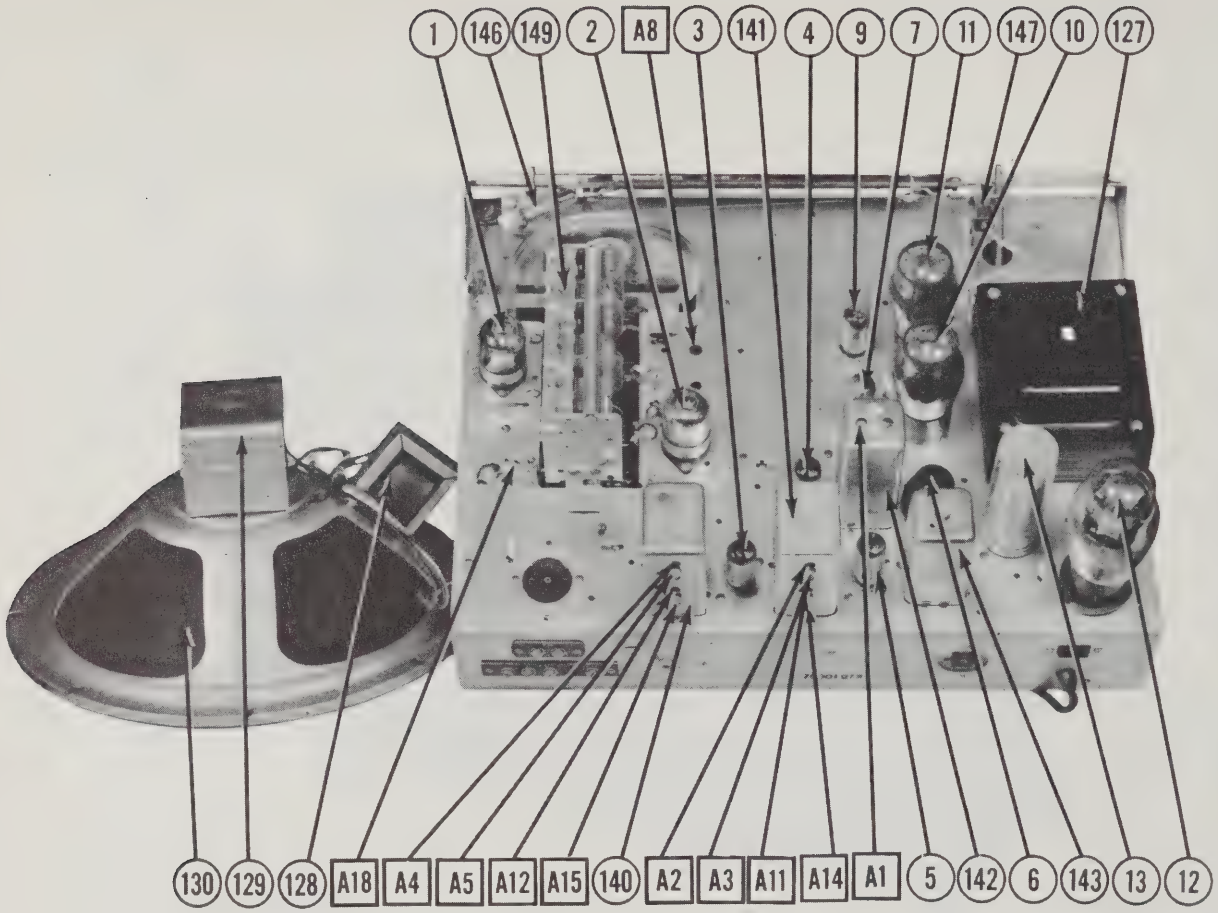
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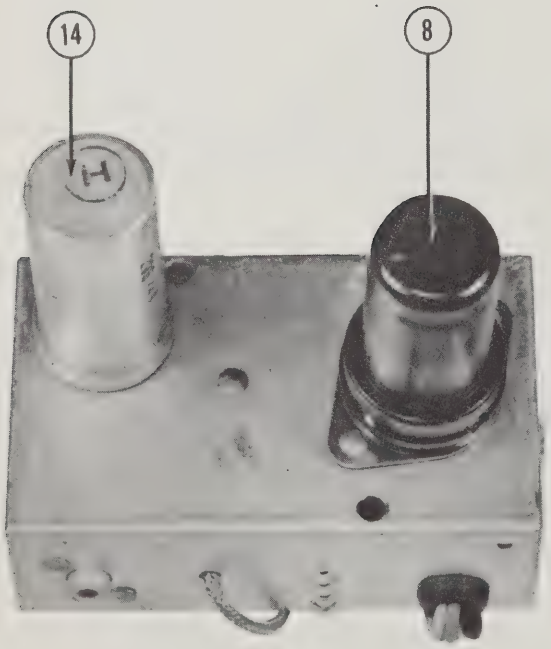
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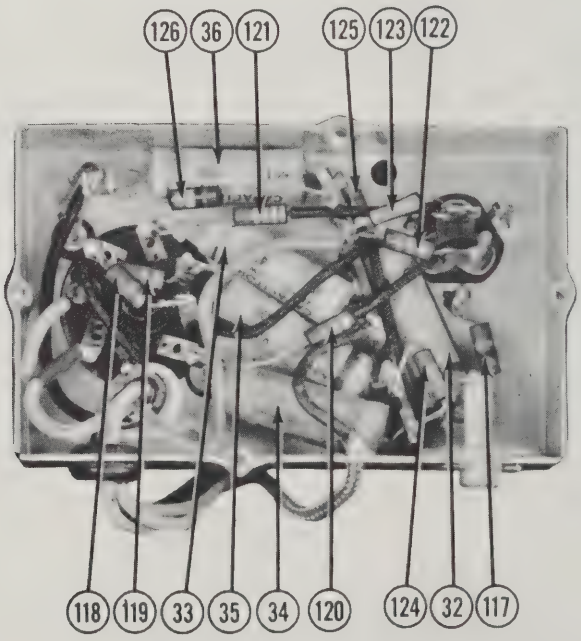
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7F8	7F8	8BW	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6BA6	6BA6	7BK	
5	Limiter	6AU6	6AU6	7BK	
6	FM Det.	6H6	6H6	7S	
7	AM Det.-AVC	6AT6	6AT6	7BT	
8	Phono Pre-Amp.	6SC7	6SC7	8S	
9	Phase Inv.	6AT6	6AT6	7BT	
10	Power Output	6Y6G	6Y6G	7AC	
11	" "	6Y6G	6Y6G	7AC	
12	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGH. PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
13A	40	450	V-3302	EL-240		UP4445	DY-406†	● Filter
B	40	400						■ "
C	16	350		UT-163		BR1635		▲ "
14A	10	450	V-4928	EL-210		UP1145	DY-2x10-450	"
B	10	450						"
15	20	25	V-3236	TA-25	PRS25-25	BR202A	M-25-25	Cathode Bypass
16	2	50	V-4880	TA-55	PRS450-2	BR245	M-4-150	Stabilizing Cap.
17A	.05	600	V-3241	TC-15	684-05	DT6S5	MPH-6-05	Line Filter
B	.05	600		TC-15	684-05	DT6S5	MPH-6-05	" "
18	.002	600	RCP10M6202M	TC-22	684-002	DT6D2	S-6-002	Output Plate Bypass
19	.002	600	RCP10M6202M	TC-22	684-002	DT6D2	S-6-002	" " "
20	.01	400	RCP10M4103A	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
21	.01	400	RCP10M4103A	TC-11	484-01	DT4S1	S-4-01	" "
22	.005	600	RCP10W6502A	TC-25	684-005	DT6D5	S-6-005	Tone Comp.
23	.002	600	RCP10W6202A	TC-22	684-002	DT6D2	S-6-002	" "
24	.01	400	RCP10M4103A	TC-11	484-01	DT4S1	S-4-01	" "
25	.05	400	RCP10W4503A	TC-15	484-05	DT4S5	S-4-01	Audio Coupling
26	.001	600	RCP10W6102K	TC-21	684-001	DT6D1	S-6-001	" "
27	.001	600	RCP10W6102K	TC-21	684-001	DT6D1	S-6-001	De-emphasis
28	.05	400	RCP10W4503A	TC-15	484-05	DT4S5	S-4-05	AVC Filter
29	.2	400		TC-2	484-.2	DT4P2	S-4-2	RF Bypass Pwr. Supply*
30	.2	400		TC-2	484-.2	DT4P2	S-4-2	" " " "
31	.05	400	RCP10W4503A	TC-15	484-05	DT4S5	S-4-05	Osc. Plate Bypass
32	.005	600	RCP10W6502A	TC-25	684-005	DT6D5	S-6-005	Phono Coupling
33	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
34	.02	400	RCP10W4203A	TC-12	484-02	DT4S2	S-4-02	Tone Comp.
35	.005	600	RCP10W6502A	TC-25	684-005	DT6D5	S-6-005	Audio Coupling
36	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	S-4-01	Tone Comp.
37	5000		RCM30B512M	1FM-25	684-005	1D5D5	MW.5-25	Limiter Screen Bypass
38	47		RCC32RR470K	1FM-45	1468-00005	5W5Q5	MO.5-45	Limiter Grid Filter
39	100		RCM20B101M	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter-Cer.
40	100		RCM20B101M	1FM-31	1468-0001	5W5T1	MO.5-31	" " " "
41	10000		RCM30B103M	TC-11	684-01	DT6S1	S-6-01	2nd IF Plate Decoupling
42	5000		RCM30B512M	1FM-25	684-005	1D5D5	MW.5-25	2nd IF Screen Bypass
43	5000		RCM30B512M	1FM-25	684-005	1D5D5	MW.5-25	AVC Filter
44	10000		RCM30B103M	TC-11	684-01	DT6S1	S-6-01	1st IF Plate Decoup.
45	5000		RCM30B512M	1FM-25	684-005	1D5D5	MW.5-25	1st IF Screen Bypass
46	5000		RCM30B512M	1FM-25	684-005	1D5D5	MW.5-25	AVC Filter
47	10000		V-5040-15	TC-11	684-01	DT6S1	S-6-01	RF Bypass Pwr. Supply
48	10000		RCM30B103M	TC-11	684-01	DT6S1	S-6-01	" " " "
49	10		RCC21U100F	MS-41	1468-00001	5W5Q1	MO.5-41	RF Bypass-Cer.
50	5000		RCM30B512M	1FM-25	684-005	1D5D5	MW.5-25	Conv. Cathode Bypass
51	22		RCC21RU220K	MS-425	1469-000025	5W5Q25	MO.5-425	Fixed Trimmer
52	500		RCC21ZY471M	1FM-35	1468-0005	5W5T5	MO.5-35	Osc. Plate Bypass-Cer.
53	10000		RCM30B103M	TC-11	684-01	DT6S1	S-6-01	Filament Bypass
54	47		RCC32RU470K	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.-Cer.
55	1000			1FM-21	1468-001	DT6S1	MW.5-21	RF Coupling-Cer.
56	500		RCC21ZY471M	1FM-35	1468-0005	5W5T5	MO.5-35	AVC Filter-Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTING-HOUSE PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
99	15KΩ	± ± ± ±	RC20AE153J	BTS-15K	Br.-Grn.-Or. Ratio Detector Diode Load
100	15KΩ	± ± ± ±	RC20AE153J	BTS-15K	Br.-Grn.-Or. " " " "
101	27KΩ	± ± ± ±	RC20AE273K	BTS-27K	Red-Vi.-Or. Tone Compensation
102	270KΩ	± ± ± ±	RC20AE274K	BTS-270K	Red-Vi.-Yl. " "
103	15 Meg.	± ± ± ±	RC20AE156M	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
104	220KΩ	± ± ± ±	RC20AE224K	BTS-220K	Red-Red-Yl. AF Plate Load
105	150KΩ	± ± ± ±	RC20AE154M	BTS-150K	Br.-Grn.-Yl. Phase Inverter Plate Load
106	10KΩ	± ± ± ±	RC20AE104K	BTS-100K	Br.-Blk.-Yl. Phase Inverter Grid
107	220KΩ	± ± ± ±	RC20AE224K	BTS-220K	Red-Red-Yl. Output Grid
108	270KΩ	± ± ± ±	RC20AE274K	BTS-270K	Red-Vi.-Yl. " "
109	110Ω	3	V-4758	AB-100	Br.-Br.-Br. Output Cathode
110	100Ω	± ±	RC20AE101M	BW-½-100	Br.-Blk.-Br. Parasitic Suppressor
111	100Ω	± ±	RC20AE101M	BW-½-100	Br.-Blk.-Br. " "
112	33Ω	± ±	RC20AE330M	BW-½-33	Or.-Or.-Blk. " "
113	33Ω	± ±	RC20AE330M	BW-½-33	Or.-Or.-Blk. " "
114	2700Ω	2	RC41AE272K	BT-2-2700	Red-Vi.-Red Filter
115	7500Ω	5	V-4759	AB-7500	Bleeder
116	100Ω	10	V-5323	AB-100	Surge Limiter-See Note 2
117	10KΩ	± ± ± ±	RC20AE103M	BTS-10K	Br.-Blk.-Or. Phono Shunt
118	3.3 Meg.	± ± ± ±	RC20AE335M	BTS-3.3 Meg.	Or.-Or.-Grn. 1st Phono Amp. Grid
119	3.3 Meg.	± ± ± ±	RC20AE335M	BTS-3.3 Meg.	Or.-Or.-Grn. 2nd Phono Amp. Grid
120	68KΩ	± ± ± ±	RC20AE683K	BTS-68K	Blue-Gray-Or. 1st Phono Amp. Plate Load
121	33KΩ	± ± ± ±	RC20AE333K	BTS-33K	Or.-Or.-Or. 2nd Phono Amp. Plate Load
122	68KΩ	± ± ± ±	RC20AE683K	BTS-68K	Blue-Gray-Or. 1st Phono Amp. Plate Decoupling
123	33KΩ	± ± ± ±	RC20AE333K	BTS-33K	Or.-Or.-Or. 2nd Phono Amp. Plate Decoupling
124	180KΩ	± ± ± ±	RC20AE184K	BTS-180K	Br.-Gray-Yl. Tone Compensation
125	10KΩ	± ± ± ±	RC20AE103K	BTS-10K	Br.-Blk.-Or. " "
126	100KΩ	± ± ± ±	RC20AE104K	BTS-100K	Br.-Blk.-Yl. " "

Note 1-Used in early production only.
Note 2-Used only in models using power transformer #V-3295.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
127A	117V AC @ 1.4A	600V CT @ .235A	5.0V AC @ 3.0A	6.4V AC @ 5.8A	V-4761	P-6315§	T22R07	
B					V-3295	Alternate Transformer		

§Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: WESTING. PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
128	1850Ω CT	4.0Ω	280Ω CT	.6Ω			T22S87		

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.				
129	200Ω	4.0Ω	V-4784			
	CONE DIA.	VC DIA.				
130	11"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA WESTINGHOUSE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
57	47		R2CC26PJ470K	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling
58	15		R2CC21CH150J					Fixed Trimmer-Cer.
59	500		R5CC2ZY471M	1FM-35	1468-0005	5W5T5	MO.5-35	RF Plate Bypass-Cer.
60	5		R2CC2CH050D	NS-55	1469-000005	5W5V5	MO.5-55	RF Coupling-Cer.
61	2700		RCM30C272G					Fixed Padder
62	2700		RCM30C272G					Common Cap. Coupling
63	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
64	270		RCM20B271J	1FM-33	1468-0003	5W5T3	MO.5-33	RF Bypass
65	270		RCM20B271J	1FM-33	1468-0003	5W5T3	MO.5-33	" "
66	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	Diode Load Cap.
67	10000		RCM30B103M	TC-11	684-01	DT6S1	S-6-01	Limiter Plate Decoup.

*Items 29 & 30 may be replaced by a single .1 MFD resonant cap. part number V-5442-1.
†Do not use bypass section.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WESTING. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
68A	2 Meg.	½	V-3293	D13-139XX		Volume Control tapped @ 500KΩ & 1 Meg.
B	Shaft		Not Req.	A		Attach to 68A per instructions
C	Switch		" "	41	" " " "	
69A	1 Meg.	½	V-3305	D13-137	M-63-Z	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 69A per instructions

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WESTINGHOUSE PART No.	IRC PART No.	IDENTIFICATION CODES
70	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. 1st RF Grid-See Note 1
71	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. AVC Network
72	6800Ω	1	RC30AE682K	BTA-6800	Blue-Gray-Red 1st RF Plate Load
73	6800Ω	1	RC30AE682K	BTA-6800	Blue-Gray-Red 2nd RF Plate Load
74	120Ω	½	RC20AE121K		Br.-Red-Br. 2nd RF Cathode
75	2.2 Meg.	½	RC20AE225M	BTS-2.2 Meg.	Red-Red-Grn. Converter Grid
76	470Ω	½	RC20AE471K	BTS-470	Yl.-Vi.-Br. Converter Cathode
77	33KΩ	½	RC20AE333K	BTS-33K	Or.-Or.-Or. Converter Plate Load
78	10KΩ	1	RC30AE103M	BTA-10K	Br.-Blk.-Or. Oscillator Plate Load
79	22KΩ	½	RC20AE223K	BTS-22K	Red-Red-Or. Oscillator Grid
80	33Ω	½	RC20AE330K		Or.-Or.-Blk. Parasitic Suppressor
81	4.7 Meg.	½	RC20AE475M	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
82	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. AVC Network
83	2.2 Meg.	½	RC20AE225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
84	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
85	15KΩ	½	RC20AE153J	BTS-15K	Br.-Grn.-Or. 1st IF Screen Dropping
86	68Ω	½	RC20AE680K		Blue-Gray-Blk. 1st IF Cathode
87	3300Ω	½	RC20AE332M	BTS-3300	Or.-Or.-Red 1st IF Plate Decoupling
88	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. Phono Shunt
89	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. AVC Network
90	68Ω	½	RC20AE680K		Blue-Gray-Blk. 2nd IF Cathode
91	33KΩ	½	RC20AE333K	BTS-33K	Or.-Or.-Or. 2nd IF Screen Dropping
92	3300Ω	½	RC20AE332M	BTS-3300	Or.-Or.-Red 2nd IF Plate Decoupling
93	47KΩ	½	RC20AE473M	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
94	220KΩ	½	RC20AE224K	BTS-220K	Red-Red-Yl. Diode Load
95	100KΩ	½	RC20AE104K	BTS-100K	Br.-Blk.-Yl. Limiter Grid
96	220KΩ	½	RC20AE224K	BTS-220K	Red-Red-Yl. Limiter Screen Dropping
97	3300Ω	½	RC20AE332M	BTS-3300	Or.-Or.-Red Limiter Plate Decoupling
98	68KΩ	½	RC20AE683M	BTS-68K	Blue-Gray-Or. De-emphasis

DATE 3/48-#436-22 S.T. #436-FOLDER #28

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

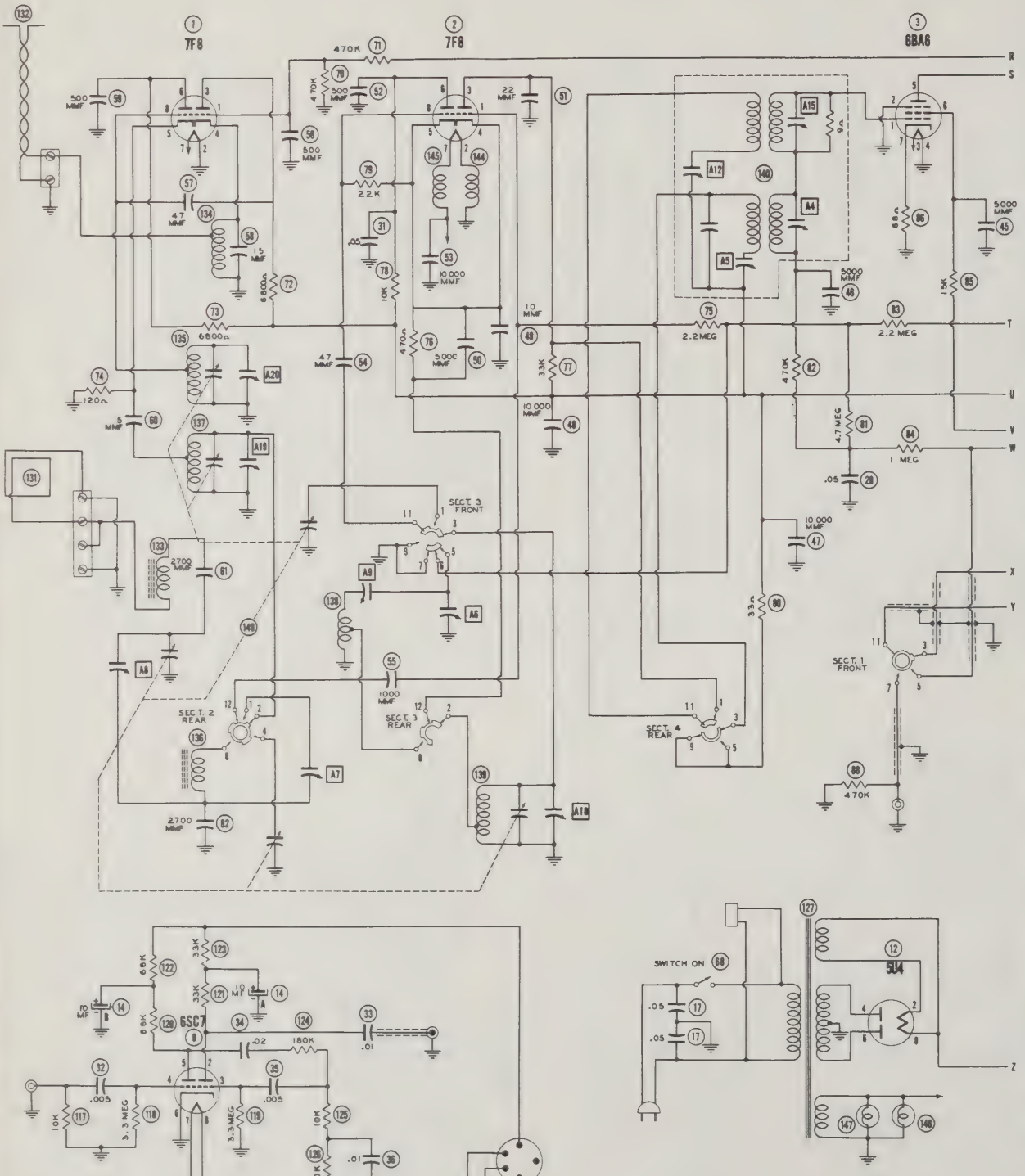
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA WESTINGHOUSE PART No.	REPLACEMENT DATA MEISSNER PART No.	
131	Loop Ant.		.1Ω	V-3283-3		
132	FM Ant.		INF.	V-4777		
133	BC Ant.Ldg. Coil		2Ω	V-4751		
134	FM Ant.Coil		0Ω	V-4887		
135	FM RF Coil		0Ω	V-5048		
136	BC Conv. "		2.8Ω	V-4752		
137	FM " "		0Ω	V-4755		
138	BC Osc. "		9Ω	V-4753	14-1040	
139	FM " "		0Ω	V-4756		
140A	Am Input IF	Inf.	9Ω ††	V-5367		††Includes both AM and FM secondary.
B	FM " "					
141A	AM Inter.IF	6.8Ω‡	6.5Ω‡	V-5368		‡Includes both AM and FM primary and sec.
B	FM " "					
142A	AM OutputIF	9Ω**	10.5Ω	V-4623		**Includes both AM and FM primary
B	FM " "		1Ω			
143	Disc. Trans.	.5Ω	.1Ω	V-4624		
144	Fil. Choke		1Ω	V-4886		
145	" "		1Ω	V-4886		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA WESTINGHOUSE PART No.		INSTALLATION NOTES
146	Bayonet	6-8	0.25	Blue	No. 44		Type 44
147	"	"	"	"	No. 44		" "

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
148	Switch	V-4760	Band-Phono
149	3 Gang Var. Cap.	V-4750	(18-485MMF) each section
A6 } A9	Trimmer Strip	V-4749	A6 BC Osc. Adj. A9 BC " Pad
A7	Trimmer	V-4747	BC RF Adj.
A8	"	V-4746	BC Ant. Adj.
A18 } A19 } A20	Trimmer Strip	V-4748	A18 FM Osc. Adj. A19 FM RF Adj. A20 FM Ant. Adj.



IF=455KC AM

IF=10.7MC FM

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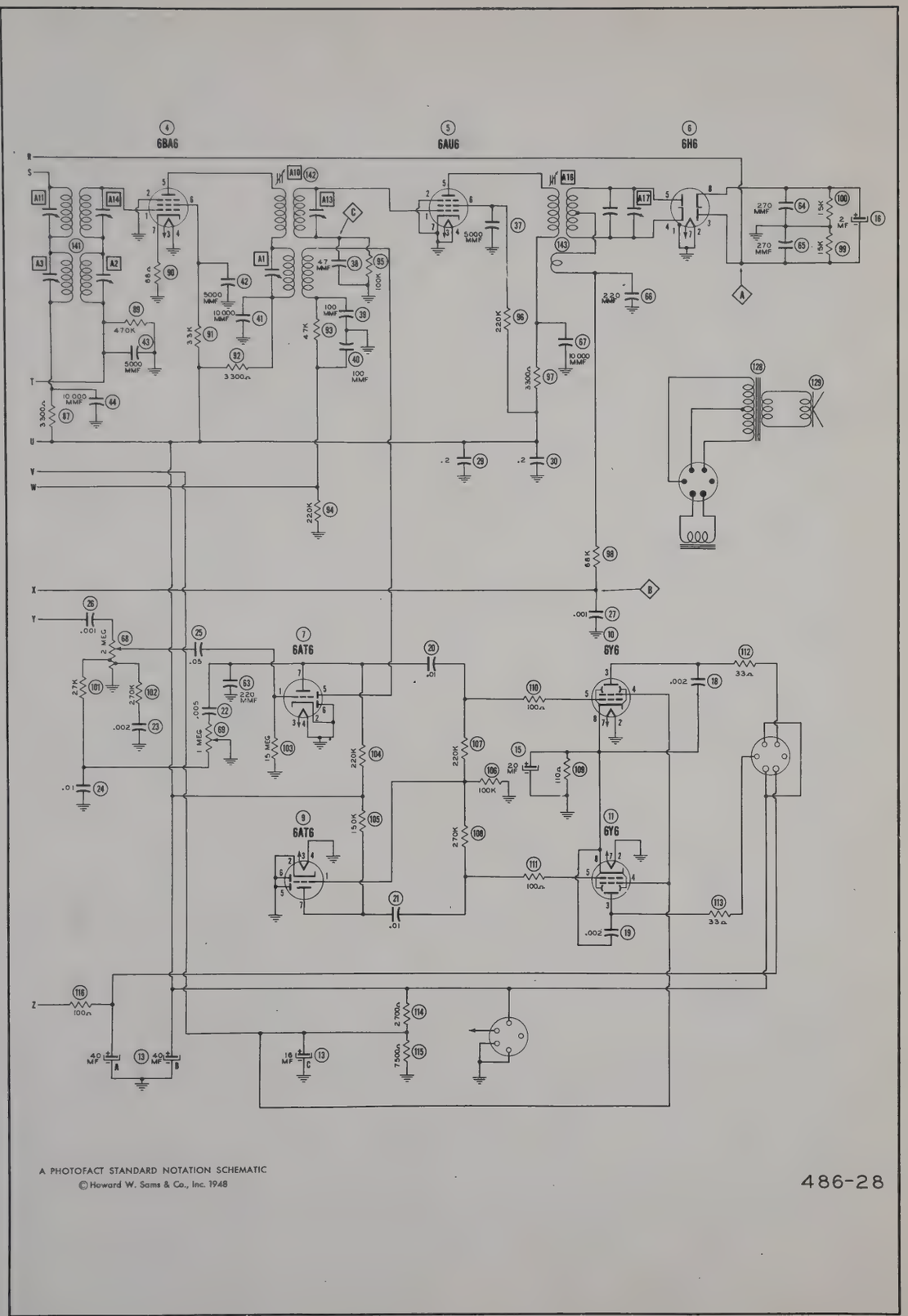

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486-28

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
** RADIO-PHONO SWITCH IN PHONO POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	7F8	-.1VDC	0V.	175VDC	0V.	1VDC	190VDC	6.4VAC	0V.
	2	7F8	-1.6VDC	.4VAC	165VDC	4.3VDC	4.3VDC	162VDC	6VAC	-16VDC§
	3	6BA6	-.1VDC	0V.	6.4VAC	0V.	215VDC	107VDC	1VDC	-
	4	6BA6	-.1VDC	0V.	6.4VAC	0V.	215VDC	94VDC	1VDC	-
‡	5	6AU6	-.4VDC	0V.	6.4VAC	0V.	237VDC	50VDC	0V.	-
‡	6	6H6	0V.	0V.	-.5VDC	.05VDC	.1VDC	-.5VDC	6.4VAC	.5VDC
	7	6AT6	-.6VDC	0V.	6.4VAC	0V.	-.2VDC	0V.	92VDC	-
**	8	6SC7	0V.	127VDC	-.4VDC	-.3VDC	95VDC	0V.	6.4VAC	0V.
	9	6AT6	-1.6VDC	0V.	6.4VAC	0V.	0V.	0V.	70VDC	-
	10	6Y6	0V.	0V.	232VDC	170VDC	-.15VDC	-.15VDC	6.4VAC	16.5VDC
	11	6Y6	0V.	0V.	237VDC	170VDC	-.2VDC	-.2VDC	6.4VAC	16.5VDC
	12	5U4G	0V.	295VDC	0V.	300VAC	0V.	300VAC	0V.	295VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	7F8	280KΩ	0Ω	15KΩ	0Ω	110Ω	15KΩ	.1Ω	0Ω
	2	7F8	4.5 Meg.	1Ω	42KΩ	500Ω	500Ω	19KΩ	1Ω	25KΩ
	3	6BA6	1.7 Meg.	0Ω	.1Ω	0Ω	12KΩ	24KΩ	75Ω	-
	4	6BA6	500KΩ	0Ω	.1Ω	0Ω	12KΩ	42KΩ	70Ω	-
‡	5	6AU6	100KΩ	0Ω	.1Ω	0Ω	13KΩ	250KΩ	0Ω	-
‡	6	6H6	0Ω	0Ω	15KΩ	INF.	INF.	15KΩ	.1Ω	15KΩ
	7	6AT6	15 Meg.	0Ω	.1Ω	0Ω	250KΩ	0Ω	240KΩ	-
**	8	6SC7	0Ω	69KΩ	3.5 Meg.	3 Meg.	140KΩ	0Ω	.1Ω	0Ω
	9	6AT6	100KΩ	0Ω	.1Ω	0Ω	0Ω	0Ω	150KΩ	-
	10	6Y6	0Ω	0Ω	9KΩ	7KΩ	280KΩ	280KΩ	.1Ω	120Ω
	11	6Y6	0Ω	0Ω	9KΩ	7KΩ	380KΩ	380KΩ	.1Ω	120Ω
	12	5U4G	INF.	9KΩ	INF.	22Ω	INF.	20Ω	INF.	9KΩ

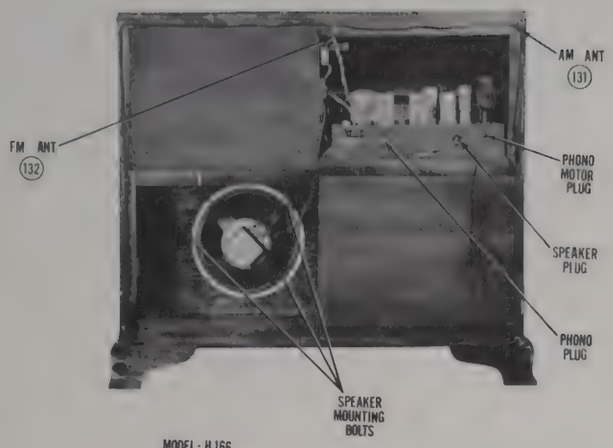
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS

ANTENNA TO CONVERTER GRID	10X		600KC
CONVERTER GAIN	3X	IN	600KC
		OUT	455KC
1st IF TRANS.	.7X		455KC
1st IF TUBE	70X		455KC
2nd IF TRANS.	.55X		455KC
2nd IF TUBE	250X		455KC
3rd IF TRANS.	.95X		455KC
PHONO PRE-AMP. 1st AUDIO	35X		400 ∿
PHONO PRE-AMP. 2nd AUDIO	35X		400 ∿
AUDIO	40X		400 ∿
OUTPUT	30X		400 ∿

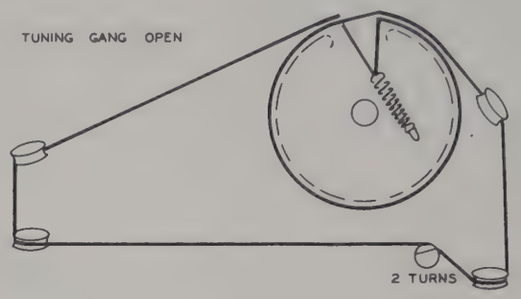
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



MODEL · H 166

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove speaker plug from chassis.
3. Remove FM leads from chassis.
4. Remove loop antenna leads from chassis.
5. Remove phono-pickup plug from phono pre-amp. chassis.
6. Remove phono-motor plug from chassis.
7. Remove phono-pre-amp. power supply plug from tuning chassis.
8. Remove pre-amp. output plug from tuning chassis.
9. Remove four screws holding tuning chassis in cabinet. Remove chassis from cabinet.
10. Remove two wood screws holding phono pre-amp. chassis in cabinet. Remove from cabinet.
11. Remove four screws holding speaker in cabinet. Remove speaker from cabinet.



DIAL CORD DRIVE

DATE 3/48-#486-28 SET #36-FOLDER #28

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to end of right angle line at extreme left end of dial.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) 6BA6, 2nd IF Tube (4). Low side to chassis.	455KC	AM (center position)	550KC	Across voice coil	A1	Adjust for maximum output.
2	.1 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A2,A3	" " " "
3	.1 MFD.	High side to Pin 1 (gird) 7F8 converter tube (2). Low side to chassis.	"	"	"	"	A4,A5	" " " "
4		(Connect loop to "L" terminals on ant. terminal strip.) Use radiation loop.	1500KC	"	1500KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5		"	1400KC	"	Tune for maximum output.	"	A7,A8	Adjust for maximum output.
6		"	600KC	"	"	"	A9	Rock tuning cap. and adjust for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	.001MFD	High side to center FM stator of tuning cap. Low side to chassis.	10.7MC (unmodulated)	FM (fully counter-clockwise)	Tuning cap. fully closed	DC probe to Point (A). Common to chassis	A10,A11 A12	Short rear FM stator of tuning cap. to chassis Detune secondaries of FM IF trans. by tightening A13, A14, A15 & A17 ¼ turn. Then adjust A10, A11 & A12 for maximum deflection.
8	.001MFD	"	"	"	"	"	A13,A14 A15	Adjust for maximum deflection.
9	.001MFD	"	"	"	"	"	A16	"
10	.001MFD	"	"	"	"	DC probe to Point (B). Common to chassis	A17	Adjust for zero deflection. Repeat Steps 9 & 10 until no further improvement can be made. Remove short from rear FM stator of tuning cap. Continue with FM RF alignment Step 11.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
Care should be exercised in placement of leads from signal generator otherwise the true IF pattern will not be obtained on scope and misalignment of the IF stages will result. Place leads as far away as possible from stages already aligned and stage being aligned.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	.001MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (freq. mod.)	FM (counter clock-wise)	Tuning cap. fully closed	Vertical input to Point (C). Ground to chassis.	A13,A10 A14,A11	Short rear FM stator of tuning cap. to chassis. Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
8	.001MFD	High side to Pin 1 (grid) 7F8 converter tube (2). Low side to chassis.	"	"	"	"	A15, A12	"
9	.001MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A16, A17	Adjust A16 for maximum amplitude. Adjust A17 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Remove short from tuning cap. Continue with FM RF alignment Step 11.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
11	72Ω carbon res.	High side to ungrounded FM ant. terminal. Low side to chassis.	105MC	FM	105MC	DC probe to Point (A). Common to chassis	A18	Adjust for maximum deflection.
12	"	"	98MC	"	Tune for maximum deflection.	"	A19 A20	Rock tuning cap. and adjust for maximum output. Seal A19 and A20 with speaker cement.

FIG. 1

FIG. 2

WOOLAROC MODEL 3-71A

TRADE NAME	Woolaroc, Model 3-71A
SUPPLIER	Phillips Petroleum Co., Bartlesville, Okla.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne with Loop Antenna
TUBES (SEVEN)	Types, 6SB7Y Converter, 12SG7 1st IF Amp., 12SG7 2nd IF Amp., 7A6 FM Ratio Det., 12SQ7 AM Det.-AVC-AF, (2) 35L6GT Power Output.
POWER SUPPLY	105-125 Volts AC — RATING .42 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1625KC — FREQ. MOD. 87.6-108.4

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are 6 calibration marks on dial backplate. Reading from left to right they are end limit, 600KC, 92MC, 1000KC, 106MC & 1550KC. To set pointer turn tuning cap. fully closed and set pointer to end limit reference mark at left end of dial backplate.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Use insulated alignment screwdriver for all adjustments.

AM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC (clockwise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.

In Step 3 connect 2 100KΩ resistors in series from Point A to chassis. The values of these two resistors must be within 1% of each other. The junction of these 2 resistors is Point B. (See schematic)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) 12SG7 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	FM (counter clockwise)	Tuning cap. fully open.	DC probe to Point A. Common to chassis	A4	Adjust for maximum deflection.
3	.01 MFD	"	"	"	"	DC probe to Point C. Common to B. (See prealignment notes)	A5	Adjust for zero deflection
4	.01 MFD	"	10.4MC	"	"	DC probe to Point A. Common to chassis	A6	Adjust for maximum deflection.
5	.01 MFD	"	11.0MC	"	"	"	A7	Adjust for maximum deflection. Repeat Steps 3, 4 and 5 until no further improvement can be made making Step 3 last adjustment. Disconnect 2 100KΩ resistors.
6	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC	"	"	"	A8,A9	Adjust for maximum deflection.
7	.01 MFD	High side to Pin 8 (grid) 6SB7Y. Low side to chassis.	"	"	"	"	A10,A11	"
8	300Ω carbon resistor	High side to terminal D of ant. terminal strip. Low side to chassis.	92MC	"	92MC reference mark.	"	A12	"
9	"	"	106MC	"	106MC reference mark.	"	A13, A14	Adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made. Continue with AM RF alignment.

FOR AM-RF AND ALTERNATE FM ALIGNMENT SEE PAGE 4

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 3/48-#486-29 SET #36-FOLDER #29

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WOOLAROC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SB7Y	6SB7Y	8R	
2	1st IF Amp.	12SG7	12SG7	8BK	
3	2nd IF Amp.	12SG7	12SG7	8BK	
4	FM Ratio Det.	7A6	7A6	7AJ	
5	AM Det.-AVC-AF	12SQ7	12SQ7	8Q	
6	Power Output	35L6GT	35L6GT	7AC	
7	Power Output	35L6GT	35L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WOOLAROC PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	60	150	CE87	DY-604020-150	EL-340	AF888D	UP44415	Filter-Red & Grn.
B	40	150		M-20-150	UT-201	PRS150-20	BR2015	" -Or.
C	40	150						" -Blue
9	5	50	CE88	M-4-450	TA-55	PRS150-4		Stabilizing Cap.
10	.075	600		MPH-6-1	TC-1	684-.1	DT6P1	Line Filter
11	.01	600		S-6-01	TC-11	684-01	DT6S1	Filament Bypass
12	.25	400		S-4-25	TC-2	484-.25	DT4P25	RF Bypass Power Supply*
13	.01	600		S-6-01	TC-11	684-01	DT6S1	Output Plate Bypass
14	.01	600		S-6-01	TC-11	684-01	DT6S1	Audio Coupling
15	.005	400		S-6-005	TC-25	484-005	DT6D5	" "
16	.01	600		S-6-01	TC-11	684-01	DT6S1	RF Bypass
17	.003	600		S-6-003	TC-23	684-003	DT6D3	Tone Comp.
18	.003	600		S-6-003	TC-23	684-003	DT6D3	Tone Comp.
19	.1	400		S-4-1	TC-1	484-.1	DT4P1	RF Bypass Pwr. Supply
20	.01	600		S-6-01	TC-11	684-01	DT6S1	1st IF Decoupling
21	.05	400		S-4-05	TC-15	484-05	DT4S5	Conv. Decoupling
22	.1	400		S-4-1	TC-1	484-.1	DT4P1	AVC Filter
23	.01	600		S-6-01	TC-11	684-01	DT6S1	Ext. Ground Isolation
24	.25	600						Phono Isolation
25A	.1							Phono Motor Filter
B	.1							" " "
26	100			MO.5-31	1FM-31	1468-0001	5W5T1	Output Grid Bypass
27	22			MO.5-425	1FM-425	1468-000025	5W5Q25	IF Coupling
28	2200							Fixed Trimmer
29	220			MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
30	470			MO.5-35	1FM-35	1468-0005	5W5T5	Tone Comp.
31	1000			MO.3-21	1FM-21	1468-001	1W5D1	Diode Load Cap.
32	100			MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.
33	220			MO.5-325	1FM-325	1468-00025	5W5T25	Filament Bypass
34	220			MO.5-325	1FM-325	1468-00025	5W5T25	RF Bypass
35	33							Fixed Padder
36	10			MO.5-41	1FM-41	1468-00001	5W5Q1	RF Coupling
37	820							RF Bypass
38	100			MO.5-31	1FM-31	1468-0001	5W5T1	Fixed Trimmer
39	33			MO.5-43	MS-43	1468-00004	5W5Q3	RF Coupling
40	470			MO.5-45	1FM-35	1468-0005	5W5T5	Conv. Screen Bypass

*Not used in all models.

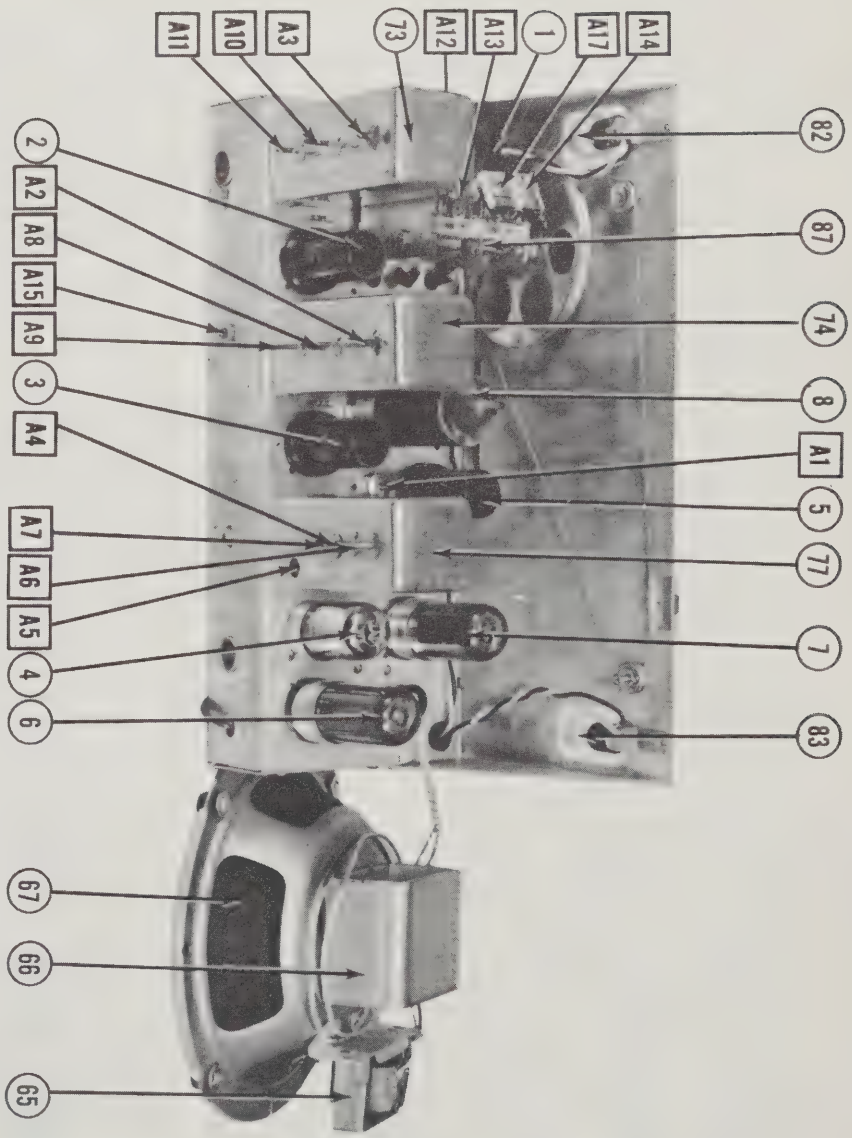
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WOOLAROC PART No.	MALLORY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
41	1 Meg.	½	RP11-105A				Volume Control tapped @ 150KΩ & 300KΩ

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WOOLAROC PART No.	IRC PART No.	IDENTIFICATION CODES
42	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
43	330Ω	½		BW-½-330	Or.-Or.-Br. Decoupling
44	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
45	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Diode Load
46	220KΩ	½		BTS-220K	Red-Red-Yl. Diode RF Filter
47	22KΩ	½		BTS-22K	Red-Red-Or. Ratio Detector Diode Load

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	WOOLAROC PART No.	IRC PART No.	
48	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
49	330KΩ	½		BTS-330K	Or.-Or.-Yl. AF Plate Load
50	330KΩ	½		BTS-330K	Or.-Or.-Yl. Output Grid
51	47Ω	1		BW-1-47	Yl.-Vi.-Blk. Output Cathode
52	47Ω	½		BW-½-47	Yl.-Vi.-Blk. Parasitic Suppressor
53	680KΩ	½		BTS-680K	Blue-Gray-Yl. Phono Shunt
54	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Series Phono
55	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Tone Compensation
56	22KΩ	½		BTS-22K	Red-Red-Or. Tone Compensation
57	68KΩ	½		BTS-68K	Blue-Gray-Or. Tone Compensation
58	330Ω	½		BW-½-330	Or.-Or.-Br. Filter
59	110Ω	2		BW-2-120	Br.-Br.-Br. "
60	12Ω	1		BW-1-12	Br.-Red-Blk. Surge Limiter
61	68Ω	2		BW-2-68	Blue-Gray-Blk. Filament Shunt
62	150Ω	½		BW-½-150	Br.-Grn.-Br. Filament Shunt-See Note
63	68Ω	1		BW-1-68	Blue-Gray-Blk. Filament Shunt-See Note
64	150Ω	½		BW-½-150	Br.-Grn.-Br. 2nd IF Screen Decoupling-See Note

Note-Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		WOOLAROC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
65	12000Ω	4.3Ω	50Ω	.6Ω	Part of EH-18		T22S87		

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			WOOLAROC PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-117		
66	PM	4.3Ω	EH-18	Mod. P8-T		
	CONE DIA.	VC DIA.				
67	7½"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

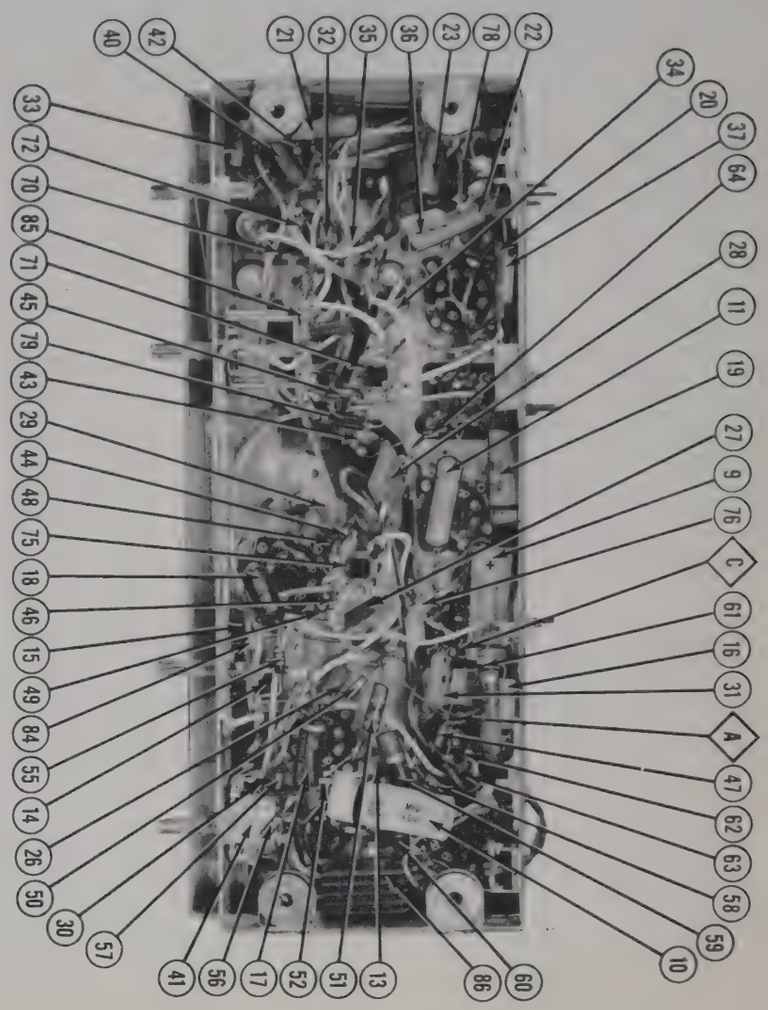
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	WOOLAROC PART No.	MEISSNER PART No.	
68	FM Ant.					
69	BC Ant.Coil	19Ω	2.2Ω	LR24		
70	FM " "		0Ω	LR17		
71	AM Osc. "	.5Ω	4.3Ω	LO14		
72	FM Osc. "		0Ω	LO13		
73A	Input IF AM	.1Ω	INF.	TM6		
B	" " FM	.8Ω				
74A	Output IF AM	.8Ω†		TM15		†Includes both primaries
B	Output IF FM					
75	IF Coil		.8Ω	TM14		
76	FM IF Plate Choke		2.1Ω	LF9		
77	Ratio Det.		.2Ω	TM5		
78	Wave Trap		0Ω	LF8		
79	" "		0Ω	LF8		
80	RF Choke		0Ω			
81	RF Choke		0Ω			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					WOOLAROC PART No.		
82	Screw	120V					Type C-7
83	"	120V					" "

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	WOOLAROC PART No.	NOTES
84	Switch	SR27	RADIO-PHONO-TONE
85	"	SR30	Band
86	Rectifier	ED2	Selenium
87	Tuning Gang	CV15-2	AM (30-427MMF, 30-427MMF)
	Dial Scale	ND31	
	Dial Pointer	NP7-2	

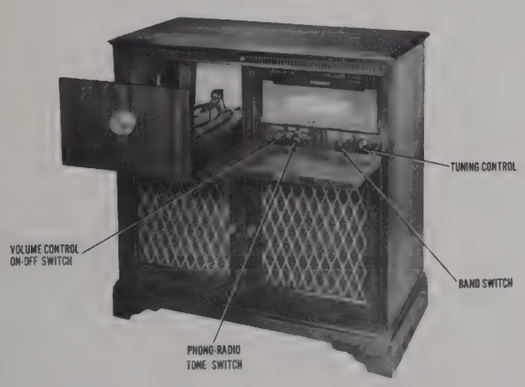


FIG. 1

FIG. 2

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal 450KC sweep with 60~ modulation except in Step 3 where 225KC sweep is used. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated	FM (counter clock-wise)	Tuning cap. fully open.	Vertical input to Point A. Ground to chassis.	A4,A8, A9	Disconnect 5 MFD cap. from Point A. Adjust A4, A8, A9 for maximum amplitude, symmetry and coincidence of pattern per Figure 1.
3	.01 MFD	High side to Pin 8 (grid) 6SB7Y. Low side to chassis.	"	"	"	"	A10,A11	Adjust for maximum amplitude, symmetry & coincidence of pattern per Figure 1.
4	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to - chassis.	10.7MC (freq. modulated 225KC sweep)	"	"	Vertical input to Point C. Ground to chassis.	A5,A6, A7	Reconnect 5 MFD cap. to Point A. Alternately adjust A6 & A7 for peaks occurring about 200KC from center of pattern and A5 for maximum straightness of crossover lines with crossover occuring at center of pattern per Fig. 2.
5	300Ω carbon res.	High side to terminal D of ant. terminal strip. Low side to chassis.	92MC	"	92MC reference mark	Vertical input to Point A. Ground to chassis.	A12	Disconnect 5 MFD cap. from Point A. Adjust A12 for coincidence of pattern per Fig. 1.
6	"	"	106MC	"	106MC reference mark.	"	A13, A14	Adjust A13 for coincidence, adjust A14 for maximum amplitude of pattern per Fig. 1. Repeat Steps 5 & 6 until no further improvement can be made. Reconnect 5 MFD cap. to Point A and continue with Am RF Alignment.

AM RF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
10	100MMFD	High side to terminal A on ext. ant. terminal board. Low side to chassis.	600KC	BC	600KC reference mark	Across voice coil	A15, A16	Adjust for maximum output
11	100MMFD	"	1550KC	"	1550KC reference mark	"	A17, A18	Adjust for maximum output Repeat Steps 10 & 11 until no further improvement can be made.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SB7Y	0V.	0V.	92VDC	92VDC	-15.7VDC§	0V.	5.4VAC	-.4VDC
2	12SG7	0V.	32VAC	0V.	-.7VDC	0V.	86VDC	6.3VAC	86VDC
‡ 3	12SG7	0V.	17VAC	0V.	-.7VDC	0V.	92VDC	32VAC	95VDC
‡ 4	7A6	14VAC	0V.	-.05VDC	0V.	0V.	0V.	-.05VDC	17VAC
5	12SQ7	0V.	-1.6VDC	0V.	0V.	-1VDC	55VDC	14VAC	0V.
6	35L6GT	6VDC	112VAC	100VDC	95VDC	0V.	0V.	80VAC	6VDC
7	35L6GT	6VDC	80VAC	100VDC	95VDC	0V.	0V.	45VAC	6VDC

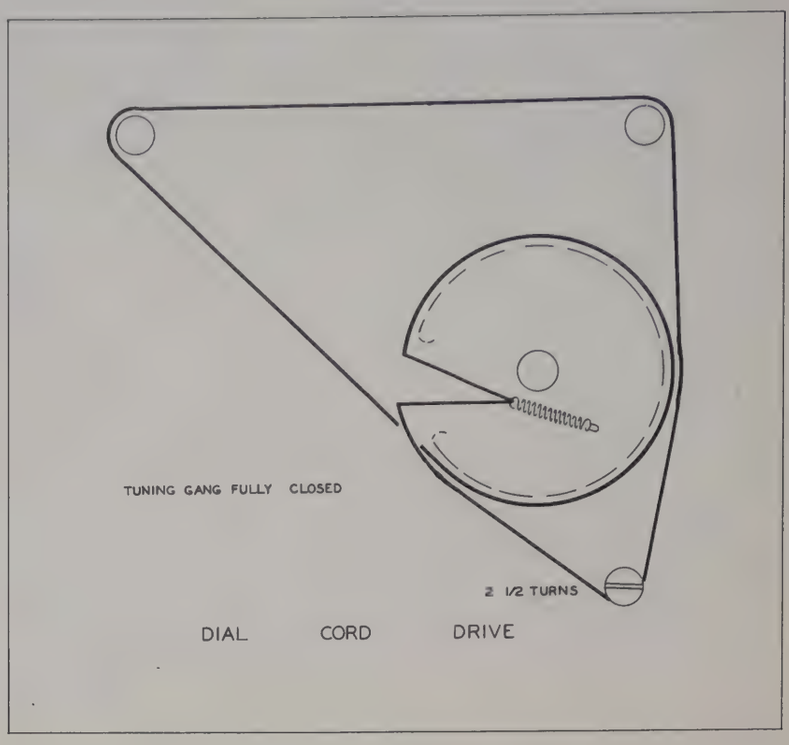
§TAKEN WITH VACUUM TUBE VOLTMETER.

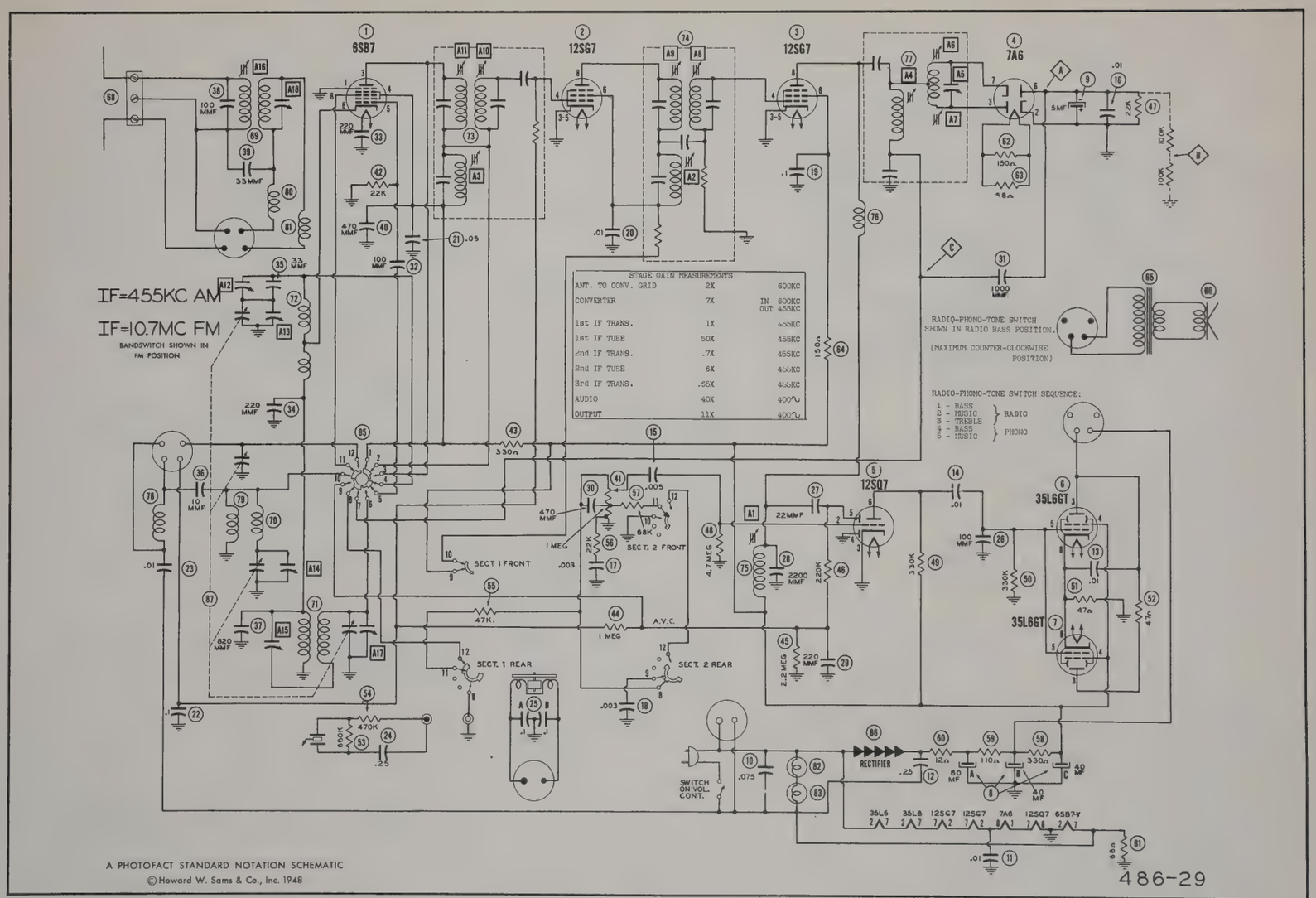
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SB7Y	0Ω	0Ω	100KΩ	100KΩ	22KΩ	.4Ω	5Ω	1.5 Meg.
2	12SG7	0Ω	28.5Ω	0Ω	2 Meg.	0Ω	100KΩ	40Ω	100KΩ
‡ 3	12SG7	0Ω	18Ω	0Ω	320KΩ	0Ω	100KΩ	28.5Ω	100KΩ
‡ 4	7A6	12Ω	0Ω	800KΩ	INF.	0Ω	22KΩ	800KΩ	18Ω
5	12SQ7	0Ω	5 Meg.	0Ω	0Ω	2.5 Meg.	400KΩ	12Ω	0Ω
6	35L6	44Ω	90Ω	100KΩ	100KΩ	300KΩ	300KΩ	65Ω	44Ω
7	35L6GT	44Ω	65Ω	100KΩ	100KΩ	300KΩ	300KΩ	40Ω	44Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.





The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

DATE 3/48-#486-29 SST #36-FOLDER #29

UNIVERSAL CAMERA CORP.
MODEL 100

TOP VIEW WITH RECORDS

UNIVERSAL CAMERA CORP.
MODEL 100

GENERAL INFORMATION

This changer is of the "postless" type in that the records are supported during operation by the center spindle only. It is designed to play twelve 10-inch, ten 12-inch, or an intermixed stack of not more than ten records. The changer shuts off automatically upon completion of the last record. Records are not dropped to the turntable, but are lowered by a slide in the centerpost. The motor is designed for 115-volt, 60-cycle operation.

LOADING—Place the desired number of records on the spindle. Grasp the record holder lift (4A) and pull upward until the record holders (4) and (7) are in position on top of the record stack. Press the Reject button (15B) to start the changer.

UNLOADING—Lift the entire stack from the turntable at one time. The record holders will bend up and allow the records to pass.

Manufactured by

UNIVERSAL CAMERA CORPORATION, 28 West 23rd Street, New York 10, New York

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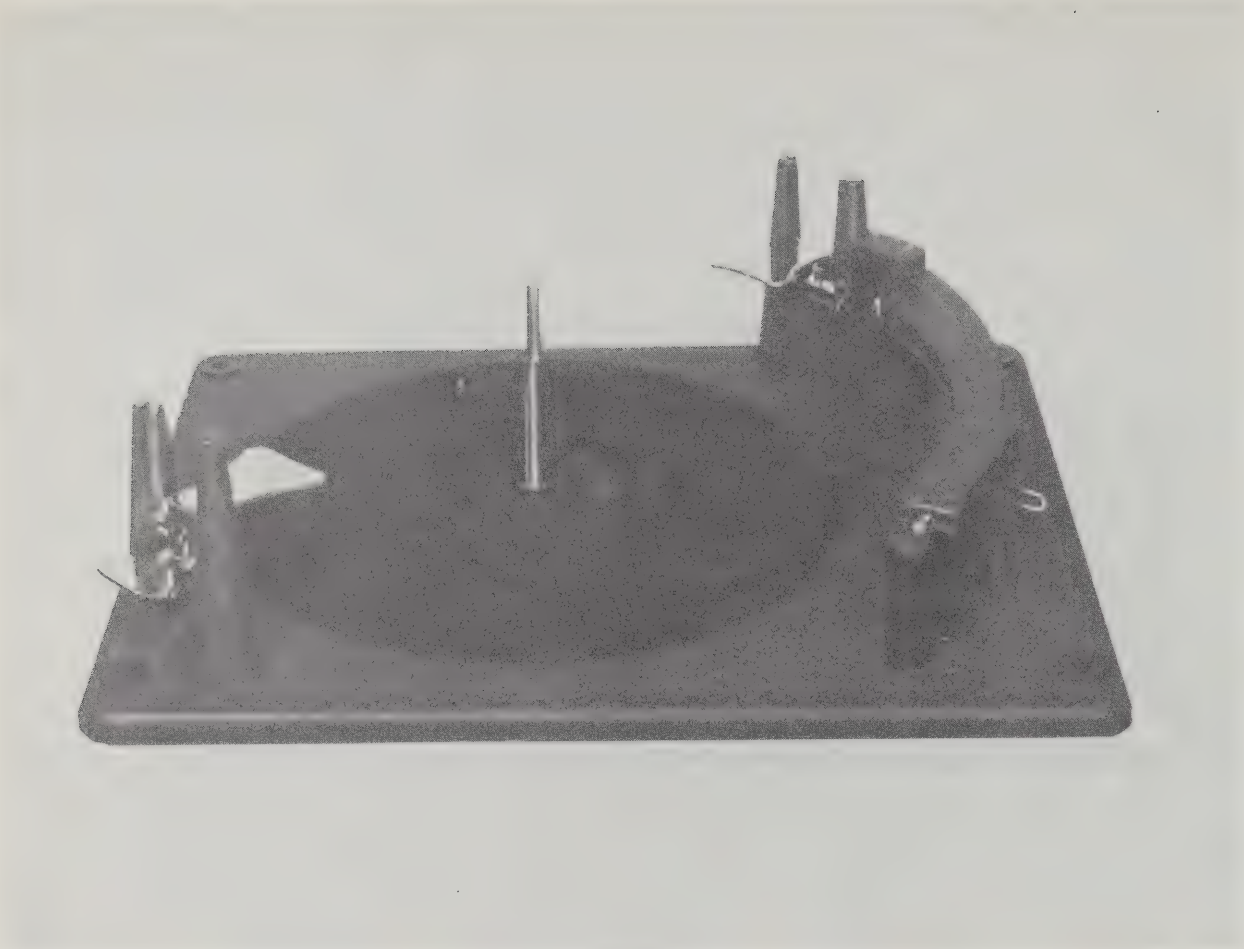


TOP VIEW

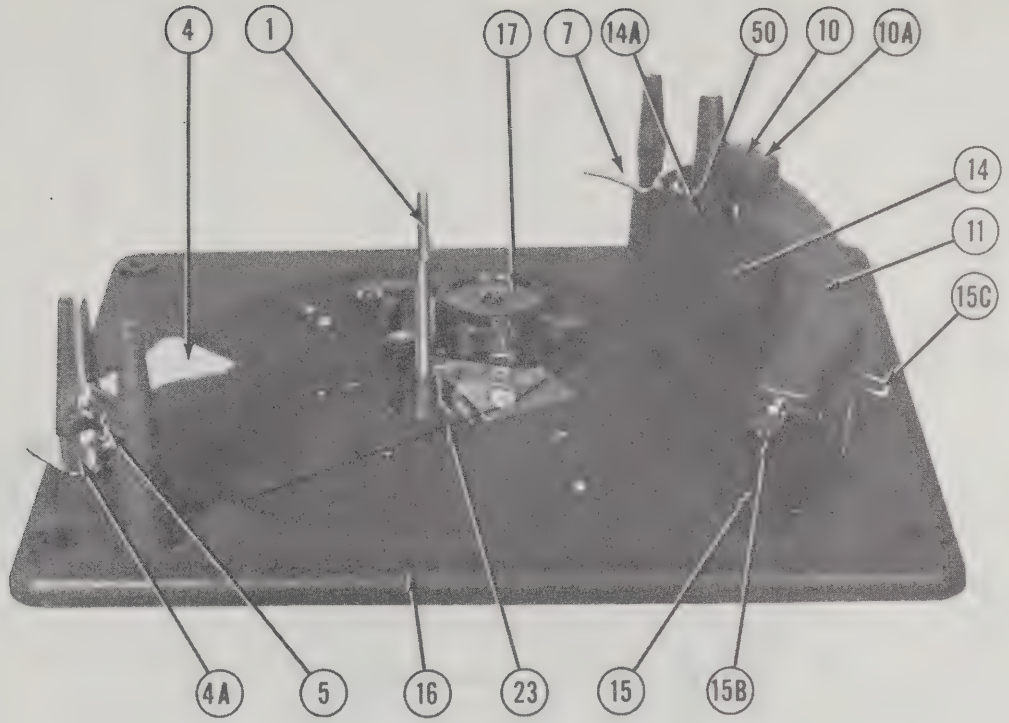
THE CHANGE CYCLE

The change cycle is started by depressing the reject button (15B) or by a velocity trip mechanism. As the pickup arm moves toward the center of the record, it carries the trip lever (43) with it. The trip lever contacts the cycle pawl (45A) and begins to force its upper end upward so that it engages a projection on the turntable hub. However, unless this action is completed within one turntable revolution, as it would be with the pickup arm needle in the eccentric groove, the cycle pawl is struck by the turntable hub projection and moved away from the tripping point. The trip lever is not affected because of its connection to the pickup arm by the trip spring (40).

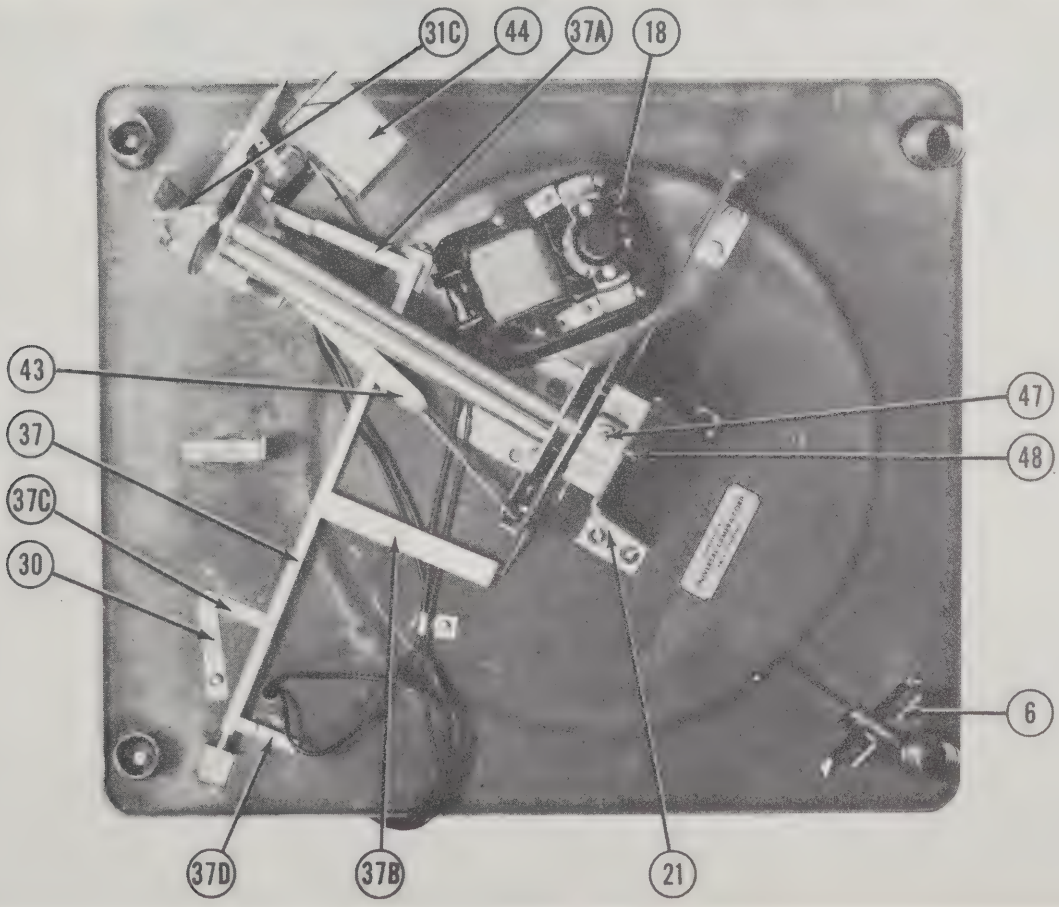
When the cycle pawl engages the hub projection, the turntable starts to rotate the cycle disc (45). As soon as the cutaway segment of the cycle disc passes the drive tire on the turntable hub, the tire engages and drives the disc. The cycle disc drives the cycle shaft (31) which rotates the lift cam (31A). The lift cam raises the pickup arm from the record by means of the pickup arm lift rod (12). The end of the cycle shaft is bent to form the pickup arm positioning finger (31C). This finger engages the trip lever plate (41) and swings the pickup arm clear of the stack of records.

As this action has been taking place, the selector drive pin (45B) on the cycle disc (45) has raised the selector rod (2) by means of the slide lever assembly (20).

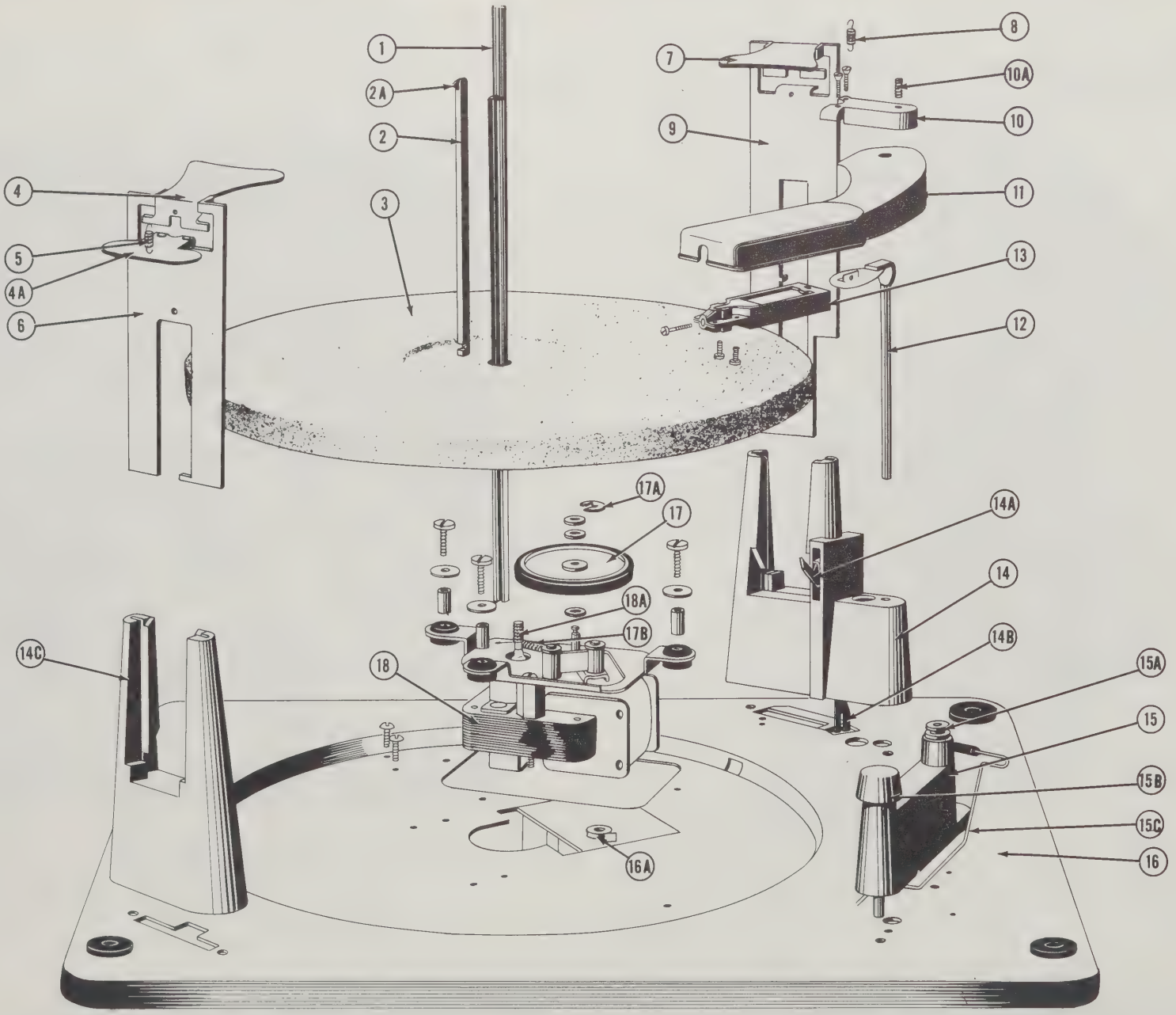
The selector rod pawl (2A) engages the lowest record of the unplayed stack, pushes it off the center post and begins to lower it to the turntable. When the record is lowered to the turntable, the pickup arm positioning finger (31C) engages the pickup arm return spring (42) and swings the arm into its set-down point. The pickup arm is lowered to



TOP VIEW LESS TURNTABLE



BOTTOM VIEW


1
2A
2
3
4
5
4A
6
7
8
10A
9
10
11
13
12
17A
17
14A
14
18A
17B
14B
14C
18
15A
15
15B
15C
16
16A

A PHOTOFACT "EXPLODED" VIEW

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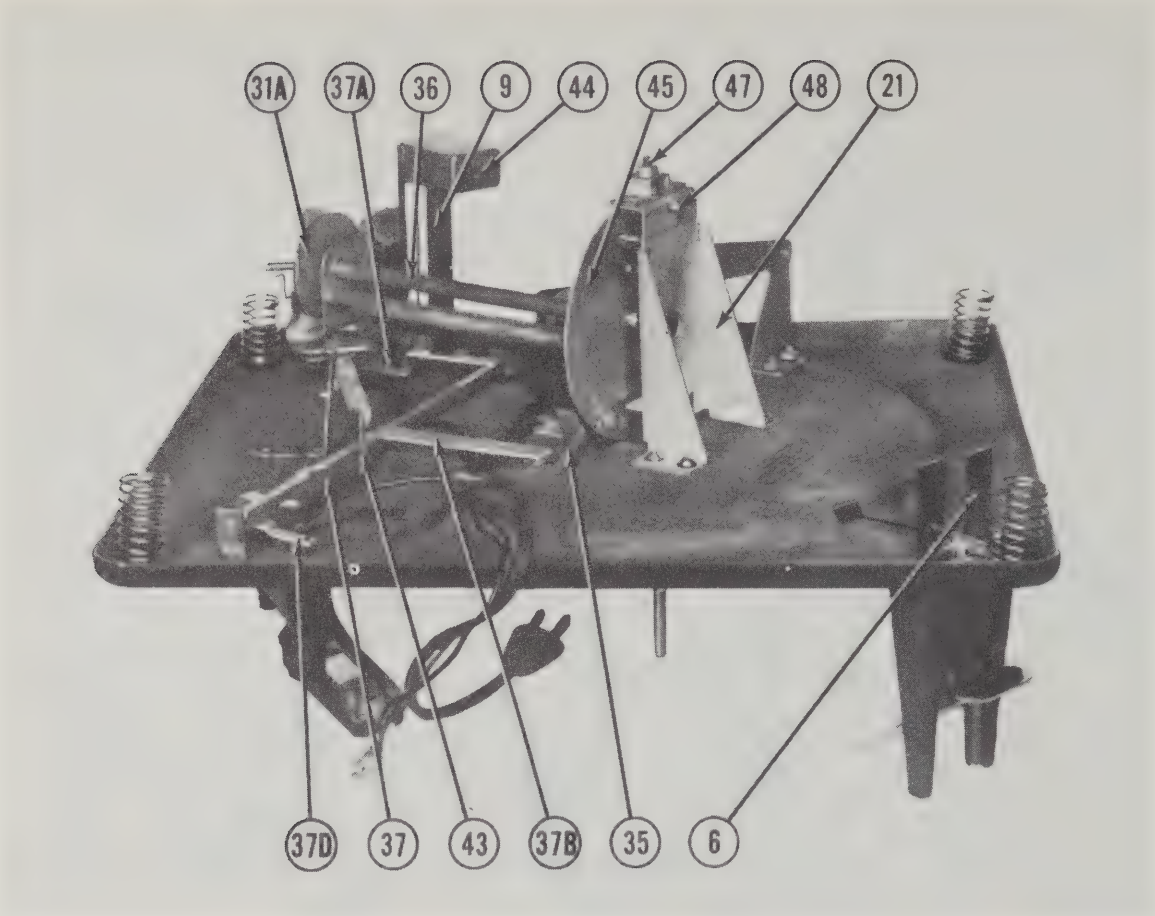


FRONT VIEW

the record by the lift cam (31A) and the cut-away segment of the cycle disc (45) comes into position opposite the hub drive tire, thus ending the change cycle.

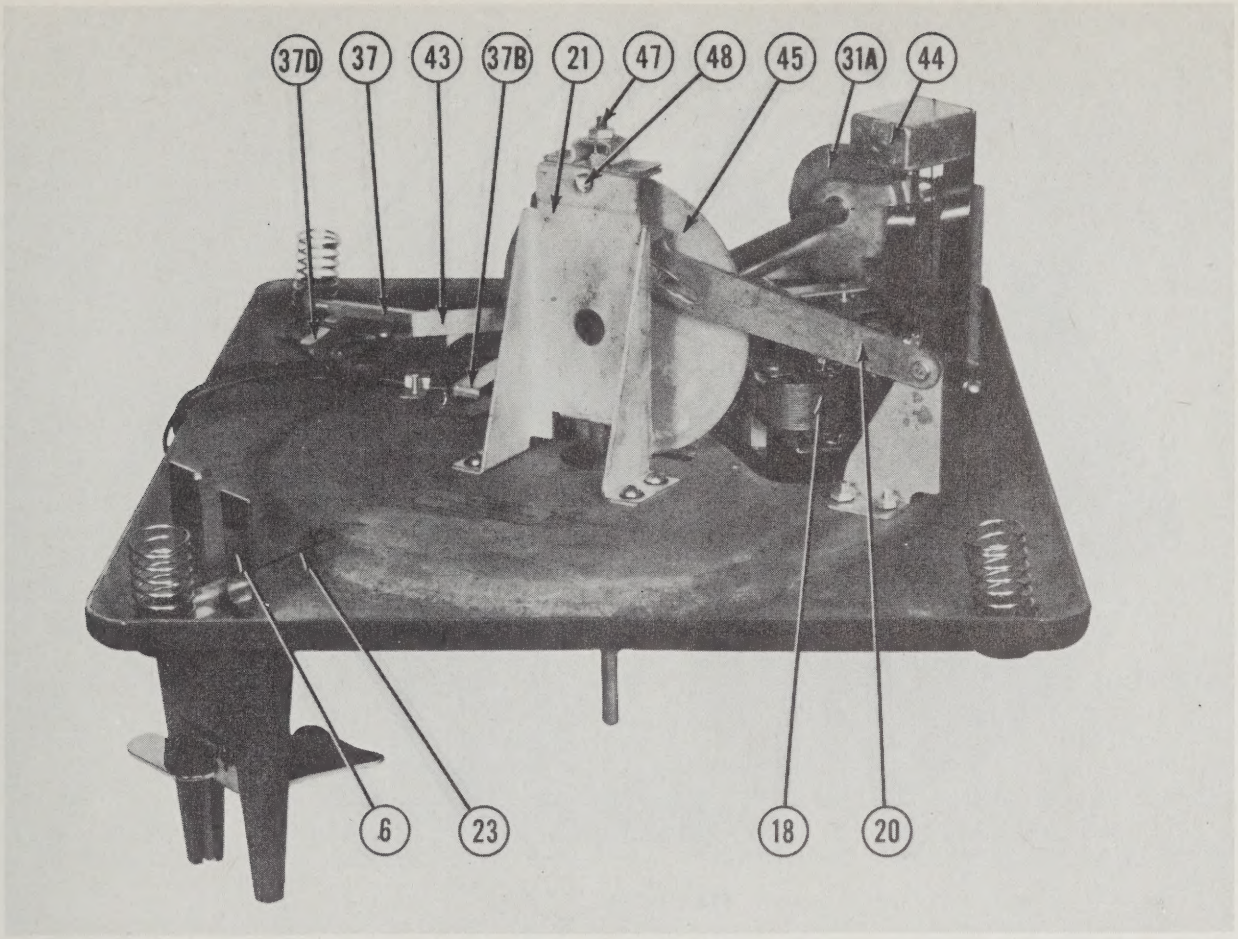
INTERMIX ACTION

The set-down point is changed for either ten- or twelve-inch records by the discriminator mechanism. If the record being lowered is a twelve-inch, it trips the discriminator pawl (14A), releasing the discriminator link (14B). This link then drops to a position where it limits the travel of the trip lever plate assembly (41) and the attached pickup arm. In the case of a ten-inch record, the link does not drop and the arm completes its travel to the innermost set-down point.

The action of the discriminator link in stopping the arm movement does not stall the mechanism since the trip lever plate is driven by the positioning finger (31C) through the return spring (42). At the beginning of each change cycle, the discriminator mechanism is reset by the upward action of the trip lever plate against the discriminator link.

AUTOMATIC SHUTOFF

As long as unplayed records are in position on the changer, the record holders (4) and (7) prevent the record holder links (6) and (9) from reaching the bottom point of their travel. When the last record has been lowered to the turntable, the rear record holder link (9) depresses the shutoff lever (49). The shutoff lever engages the lower end of the pickup arm return spring (42) and swings it aside so that the pickup arm does not move in to the set-down point. Instead, the arm is lowered in its outermost position directly over the "off" button of the control assembly, thus turning the unit off.



LEFT SIDE VIEW

REJECT MECHANISM

The reject mechanism serves to start the changer for the first record of a stack as well as to reject an unwanted record. When the reject button (15B) is pressed, the start arm (37D) is actuated and, in turn, actuates the control bar (37). As the control bar moves, it, in turn, actuates the cycle pawl (45A) by means of the cycle arm (37B); actuates the control switch (51) by means of the switch arm (37C), and resets the discriminator link (14B) by means of the discriminator arm (37A).

The control bar is held in normal position by the control bar spring (30) which bears against the switch arm.

TROUBLES

Failure to Lower Record

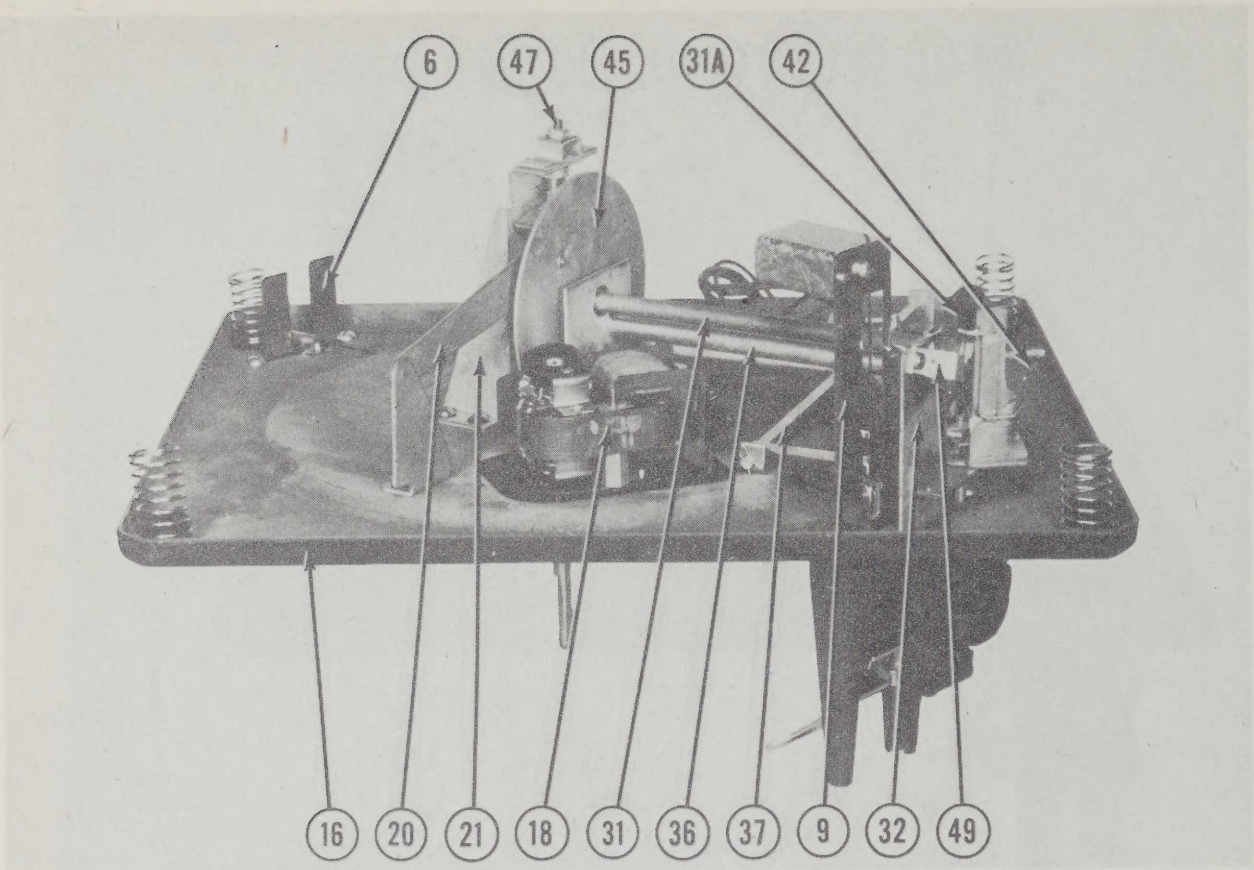
1. Failure of operator to raise record holder lift (4A) after loading.
2. Record too thick.
3. Center post incorrectly adjusted. If set too high, the record will not be pushed off the step. To adjust, loosen lock screw (49) and lock nut (46); back off screw (47) not more than one-quarter turn at a time. Push center post down and tighten clamp screw and lock nut. If post is too low, record center holes will be damaged.

Failure to Cycle Upon Completion of Record

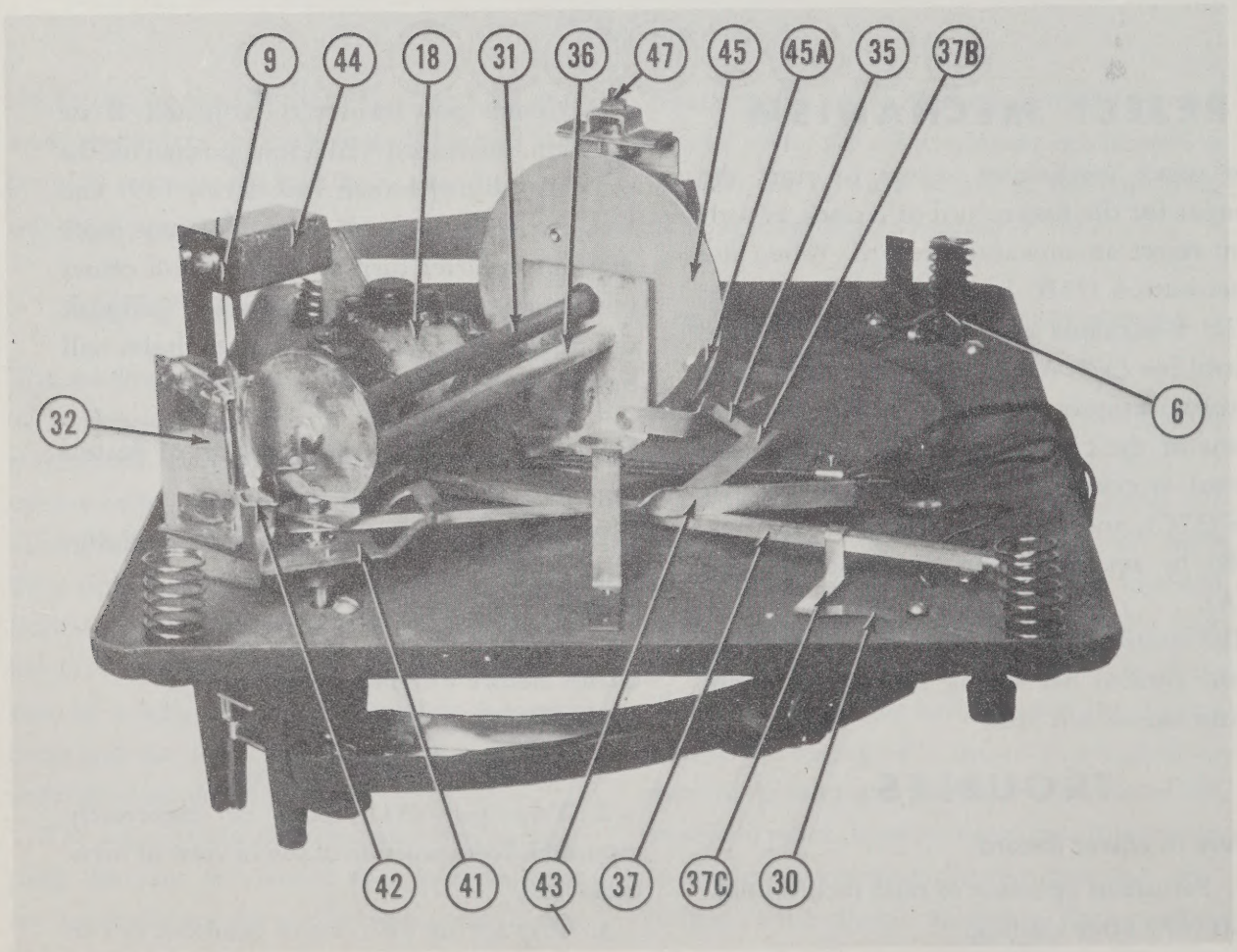
1. Cycle pawl (45A) binding.
2. Drive tire (53) on turntable hub slipping.
3. Trip pin (52) missing.

Cycles Before Playing Record or Cycles Continuously

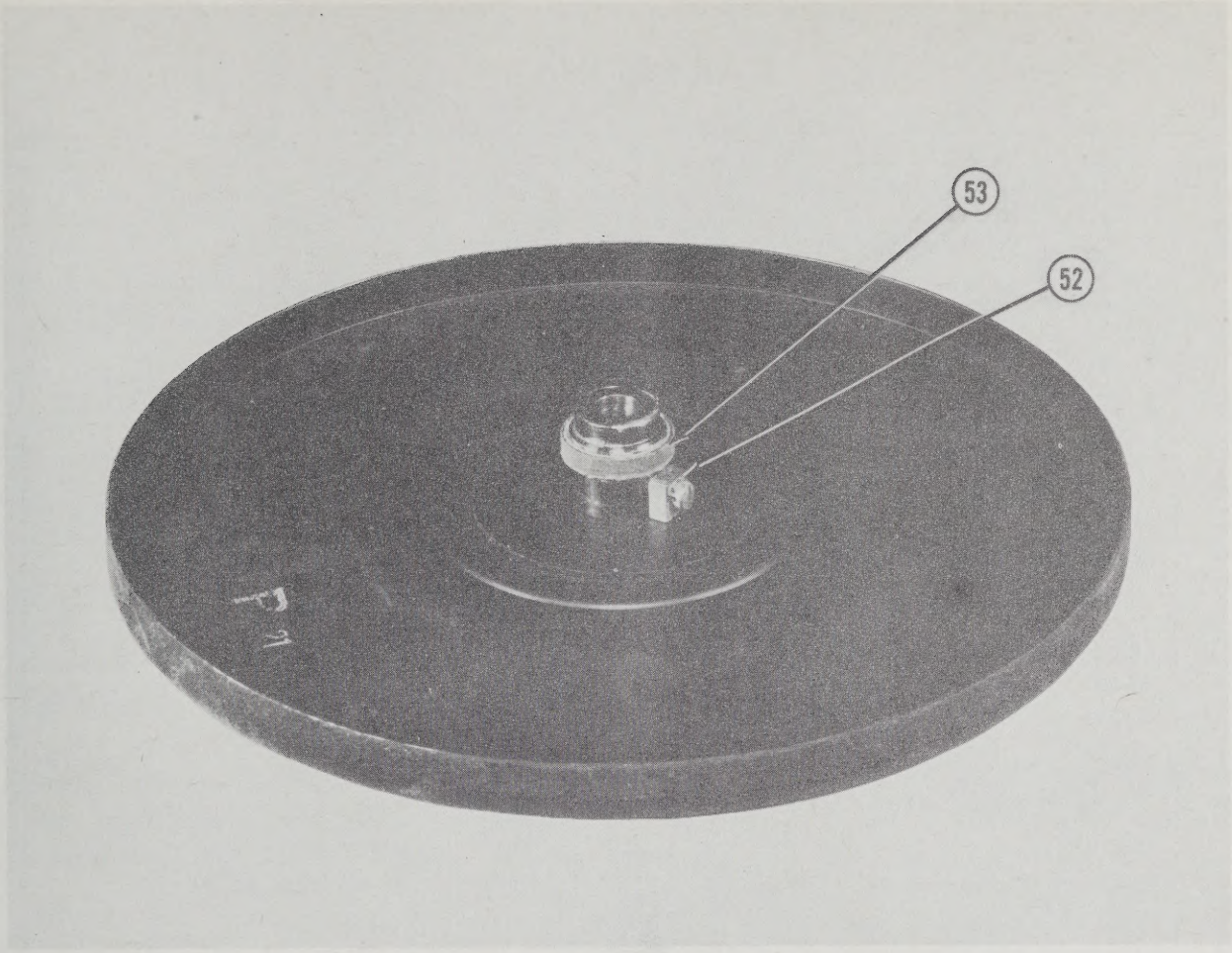
1. Cycle pawl (54A) binding.
2. Trip pin (51) loose or incorrectly mounted. Note position of pin in view of turntable hub.
3. Trip spring (40) out of position; not in notch on trip plate (41).



REAR VIEW



RIGHT SIDE VIEW



TURNTABLE UNDERSIDE

TROUBLES—*Continued*

Failure to Shut Off After Last Record

1. Record holder cord adjustment too short. Adjust by reclamping behind weight (44). Both sides (6) and (9) should hit bottom at the same time.
2. Bent or broken arm return spring (42).
3. Bent or missing shutoff lever (32C).

Incorrect Pickup Set-Down Position

1. Minor adjustment may be made by loosening the set-down point adjusting screw (54) and repositioning the arm. This screw is on the inner side of the arm near the pivot and clamps a small plate. Adjustment is best made when the mechanism is at the point of the change cycle where the arm is about to descend on the record.

2. If the adjustment screw (54) does not give a wide enough range of adjustment, it will be necessary to loosen the set screws in the trip plate collar (part of 41) and turn the shaft (12) to the proper position.

Discriminator Fails to Function

1. Discriminator spring (50) broken or missing.

2. Trip plate (41) too high on shaft (12) will cause all setdowns to be for 12-inch record regardless of record to be played.

3. Trip plate (41) too low on shaft (12) will cause all setdowns to be for 10-inch record regardless of record to be played.

Pickup Arm Height Incorrect During Cycle

1. This is adjusted by turning the pickup arm adjustment screw (10A). Clockwise rotation will raise the arm; counterclockwise rotation will lower it.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	PH-30	Center post
2	PH-34	Selector rod
2A	PH-35	Selector pawl
3	PH-80	Turntable
4	PH-65-A	Front record holder
4A	PH-102	Record holder lift
5	PH-214	Front record holder spring
6	PH-66	Front record holder link
7	PH-65-B	Rear record holder
8	PH-214	Rear record holder spring
9	PH-67	Rear record holder link
10	PH-72	Pickup arm bracket
10A	PH-119	Pickup arm adjustment screw
11	PH-77	Pickup arm
12		Pickup arm lift rod
13	PH-99	Pickup cartridge
14	PH-62	Pickup arm base
14A	PH-63	Discriminator pawl
14B	PH-64	Discriminator link
14C	PH-69	Record holder boss
15	PH-75	Control base
15A	Part of 15	Off button
15B	Part of 15	Reject button
15C	PH-143	Spring clamp
16	PH-100	Base plate
16A	PH-134	Idler pulley
17		Idler wheel
17A		Idler wheel retaining clip
17B		Idler wheel tension spring
18		Motor
18A		Drive sleeve
19	PH-134	Idler pulley
20	PH-47	Slide lever assembly
20A	PH-105	Start pawl
21	PH-45	Center post bracket
22	Part of 24	Bearing thrust washers
23	PH-104	Record holder cord
24	PH-33	Ball bearing assembly
25	PH-197	Selector rod spring
26	PH-60	Turntable bearing

Ref. No.	Part No.	DESCRIPTION
27	PH-175	Rear control bar bracket
28	PH-177	Control bar hairpin clip
29	PH-134	Idler pulley
30	PH-123	Control bar spring
31	PH-38	Cycle shaft
31A	PH-49	Lift cam
31B	PH-167	Spring washer
31C		Pickup arm positioning finger
32	PH-92	Stiffening plate
32A	PH-103	Friction spring
32B		Discriminator guide
32C	PH-96	Shutoff lever
33		Shutoff lever spring
34	PH-44	Cycle disc bracket
35	PH-105	Start pawl
36	PH-166	Spacer bar
37	PH-89	Control bar assembly
37A	PH-172	Discriminator arm
37B	PH-171	Cycle arm
37C	PH-170	Switch arm
37D	PH-169	Start arm
38	PH-174	Front control bar bracket
39		Pickup arm return spring bracket
40	PH-71	Trip spring
41	PH-52	Trip lever plate
42	PH-74	Pickup arm return spring
43	PH-53	Trip lever
44	PH-87	Record holder weight
45	PH-39	Cycle disc
45A	PH-42	Cycle pawl
45B	PH-40	Selector drive pin
46		Center post adjusting screw lock nut
47	PH-179	Center post adjusting screw
48		Center post lock screw
49		Shutoff lever
50	PH-161	Discriminator spring
51	PH-93	Changer switch
52	PH-51	Trip pin
53	PH-88	Drive tire
54	PH-119	Pickup arm set-down adjustment screw